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TAXONOMY
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ETHIOPIAN CULICIDAE—*ERETMAPODITES* THEOBALD : DESCRIPTION OF FOUR NEW SPECIES OF THE *CHRYSOGASTER* GROUP WITH NOTES ON THE FIVE KNOWN SPECIES OF THIS GROUP.

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Introduction.

Haddow (1946) divides *Eretmapodites* into four groups which are based mainly on adult ornamentation. This paper deals entirely with one group, the *chrysogaster* group, which has been defined as having the scutum without ornamentation, or almost so, and the *apn* silvery (Haddow, 1946).

The five known species of this group are *E. chrysogaster* Graham, *E. intermedius* Edwards, *E. subsimplicipes* Edwards, *E. semisimplicipes* Edwards and *E. grahami* Edwards.

While a collection of mosquitoes of the genus *Eretmapodites* from the Semiliki forest, Bwamba, Toro District, Uganda, were being examined, the three species of the *chrysogaster* group recorded by Haddow (1946) were found, together with *E. intermedius* and four hitherto undescribed representatives of this group. There are, therefore, now nine species in the *chrysogaster* group, eight of which occur in Bwamba.

The four new species were discovered on examination of the male terminalia by which alone the various species of this group can be differentiated. No external character was found which would serve to separate the females of these species from each other and no definite differentiating character could be found which would serve to separate them from all the known species. Thus it was not found possible to pick out the females of the four new species from the many wild caught Bwamba *Eretmapodites*, and the following descriptions deal only with the males.

Although they cannot be distinguished on external characters and resemble some of the known species very closely, the Bwamba specimens have been given specific status on the evidence of the male terminalia, the differentiating characters of each being very distinct from each other and from those of the known species. Additional evidence of their specific status is afforded by their distribution which is coterminous, and all species have been taken at Mongiro, one small patch of forest which has been described by Haddow, Gillett and Highton (1947).

The four new Bwamba species are now described and additional characters not noted by Edwards (1941) and Haddow (1946) are given for the other species of this group.

The nomenclature used in describing the male terminalia is that of Edwards (1941), but with one slight alteration. To the writer the basal arm of the coxite referred to by Edwards in describing the male terminalia of the species of the *chrysogaster* group is equivalent to the basal lobe which he describes for the other species of *Eretmapodites*. Thus, to provide a standard nomenclature

for the complex appendages of the male terminalia of this genus, Edwards' basal arm is called the basal lobe and it has been divided into an arm and terminal blades.

Eretmapodites chrysogaster Edwards.

Material examined comprises 23 males from Bwamba identified on dissections of male terminalia.

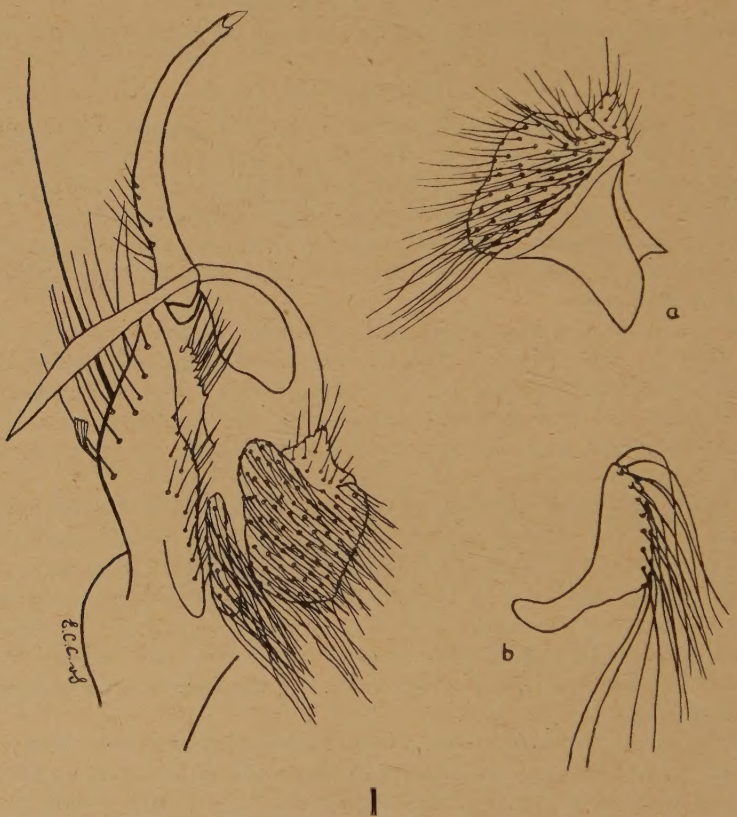

Fig. 1.—*Eretmapodites intermedius* Edwards. Male terminalia. *a*, Distal claspette ; *b*, proximal claspette.

Adult.—Characters to be noted in addition to those given by Edwards and Haddow are : Integument of scutum (in dried specimens) dark brown, but this character probably variable, depending on the freshness of the specimens ; the extent of the yellow markings on femora variable, none of the specimens examined have more than half of the posterior surface of the hind femora pale, sometimes only a narrow yellow line below on basal one third, and usually only indistinctly pale on basal half below ; sometimes the first abdominal tergite has no dorsal silvery spots. *Terminalia* as in Edwards, but note distal claspette flat and the expanded inner edge of tip very often folded tergally, giving claspette a cupped appearance, like a short-handled spoon, with the patch of hairs at the tip filling the " bowl " ; outer surface of arm of basal lobe with short fine hairs on basal half.

Eretmapodites intermedius Edwards.

Material examined consists of 5 males from Bwamba, identified by dissections of male terminalia, and 2 males from Teita, Kenya, lent to me by Mr. Hopkins, Senior Entomologist (Medical), Uganda, identified by Edwards and on dissections of male terminalia.

Adult.—As described by Edwards. Additional characters to note : General colour of the scutum dark brown, like *chrysogaster*, and the lateral yellow lines no more noticeable than in some *chrysogaster* ; hind femora in the 5 Bwamba and the 2 Teita specimens dark,

FIG. 2.—*Eretmapodites mahaffyi* sp. n. Male terminalia.

only indistinctly pale below basally up to a half, the 2 dorsal silvery spots on the first abdominal tergite sometimes absent. *Terminalia* (fig. 1), as in Edwards, but his description of the distal claspette is inadequate and the figure misleading. To the author the distal claspette in this figure appears to consist of a swollen, tri-lobed, bowl-shaped tip balanced on a very short wide stalk, whereas the true form of this claspette as seen from lateral aspects consists of a short, stout, bare, hollow stalk, open at the back, with a large hairy disc, which is roughly pear-shaped and which closes the top like a lid (fig. 1*a*). The upper and broader edge of this disc is extended in the middle to form a short, broad, triangular point and below this point the disc is slightly concave. At the lower and narrower edge of this disc the simple hairs which cover its surface are longer than the rest and curved inwards and downwards, following the line of the long hairs on the proximal claspettes, and with these form a conspicuous tuft. The proximal claspettes are flat and consist of a fairly long narrowish stalk with an enlarged upturned tip. The claspette is bare except for a number of long, simple, inwardly curved hairs along the outside edge of the tip and these hairs are longer than the longest hairs on the distal claspette. Viewed

from tergal aspects all specimens examined showed the enlarged disc top of the distal claspettes entirely covering the stalk so that it looked like a flat disc with a slight dent at one end. From this aspect the tuft of long hairs, composed of the hairs of the proximal claspettes and the long hairs on the lower edge of the distal claspettes, is very prominent. Outside edge of the arm of the basal lobe with short fine hairs for full length.

Eretmapodites mahaffyi sp. n.

Described from holotype from Bwamba. Hind tarsi missing.

Adult.—Very similar to *E. chrysogaster*, differing as follows: White line on proboscis below not so well developed, narrower than in *chrysogaster* but distinct; scutum rather rubbed, but distribution of yellow and black scales as in *chrysogaster* except that there seems to be a rather broader yellow line round the outside edge of scutum; integument of scutum orange yellow; first abdominal tergite without dorsal silvery patches; femora yellow on basal one-third below. *Terminalia* (fig. 2) differs from all other species of this group in the shape of the distal claspette. Style stout, only slightly tapered and bent, with a few hairs on mid third, and a short stout terminal spine. Coxite small and with a few scales and numerous hairs on the external border one of which, at about a half, is stouter and probably longer than the rest, but broken off on the specimen examined. Tergal flange not greatly extended and with a number of flattened spine-like hairs on its edge and a patch of fine hairs on outer surface. Apical lobe with a number (about 9) of long flattened spine-like hairs on raised tubercles. Basal lobe a long, slender, hairy arm with 2 narrow appressed terminal blades. When the terminalia are viewed from tergal aspects, only the enlarged tips of the distal claspettes are seen and this consists of a large disc with a long rectangular projection which lies between the tergal flange and the apical lobe of coxite and overlaps the coxite near the tip; it is covered with fine simple hairs. As this is a unique specimen no manipulation of the terminalia has been done for fear of damaging it, but the stalk of the distal claspette appears to be short and stout and is probably open behind and hairy on the upper and outer edge. Proximal claspettes small and short, consisting of a short, narrowish, bare stalk with a flat, slightly enlarged tip along the edge of which there is a double row of fine inwardly curved hairs.

Eretmapodites haddowi sp. n.

Described from holotype and one male paratype from Bwamba, Uganda.

Adult.—This species is very similar to *chrysogaster*, differing as follows: The proboscis of these two specimens have a very indistinct pale line below which is composed of golden yellow scales, not whitish as in *chrysogaster*; integument of scutum (in dried specimens) is lighter than *chrysogaster*, being more yellow brown; distribution of the yellow and black scales on scutum as in *chrysogaster*; legs with variable amount of yellow below, hind femora pale below posteriorly on basal one-third to two-thirds, feathering on hind tarsi sparse and like *subsimplicipes*; no dorsal silvery spots on first abdominal tergite in the 2 specimens examined. *Terminalia* (fig. 3) differ from all other species of this group in the shape of the distal and proximal claspettes. Style slender and only slightly tapered and curved at tip, with a few hairs on mid third and a short stout terminal spine. Coxite small and narrow, with numerous long hairs on the external border, one of which, below a half, is longer and stouter than the rest; the tergal flange consists of a slight bulge and has on its edge two rather flattened spine-like hairs and a few fine hairs; apical lobe with a number of long, flattened, spine-like hairs; basal lobe with a long, slender arm, which is covered with minute fine hairs and with 3 or 4 long, slender, appressed terminal blades. Distal claspette boat-shaped, viewed from tergal aspects, and the enlarged tip is sparsely covered with short simple hairs. Viewed laterally and from sternal aspect it is seen to have a short broad stalk with the enlarged tip bearing the simple hairs tilted towards the tergal aspect and

there is a curved sternal flange, which arises from near the upper edge of the enlarged tip and extends to the base of the stalk on sternal side (fig. 3*a*); this flange is covered with very short fine hairs. The proximal claspette is large and in the 2 specimens examined extended outwards. It consists of a short stoutish stalk with a flat enlarged tip which is sparsely covered with long, fine, simple, curved hairs.

FIG. 3.—*Eretmapodites haddowi* sp. n. Male terminalia. *a*, Distal claspette from behind.

Eretmapodites harperi sp. n.

Described from holotype and 8 male paratypes from Bwamba.

Adult.—Like *chrysogaster*, differing as follows: Integument of scutum (in dried specimens) yellow brown; femora yellow below, posteriorly, on basal one-third to half, feathering of hind tarsi sparse like *semisimplicipes*; no dorsal silvery spots on first abdominal tergite. *Terminalia* (fig. 4) distinguished on character of the distal claspette. Style short, stout, slightly tapered and curved, with a few hairs and scales on mid third and a short, stout terminal spine. Coxite small, with numerous hairs and scales on external border, two of which about the middle are longer and stouter than the rest; tergal flange not greatly extended and with a number of flat spine-like hairs on its edge and a patch of fine hairs tergally. Apical lobe with about 9 short, flattened, spine-like hairs on raised tubercles. Basal lobe with a long, slender, hairy arm and with 3 or 4 fairly broad appressed terminal

blades. Distal claspette (fig. 4*b*) consists of a short, stout, hollow stalk, open at the back with an enlarged tip, the flat top of which is covered with numerous short, fine, simple hairs and a patch of fine hairs on internal border. Proximal claspette small and flat, with a bare narrow stalk and a slightly enlarged tip, which bears distally a double row of fine inwardly curved hairs.

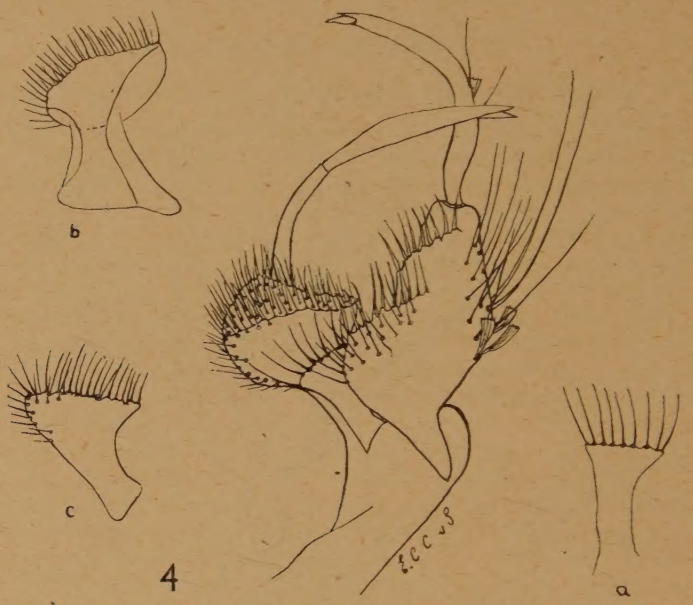

FIG. 4.—*Eretmapodites harperi* sp. n. Male terminalia. *a*, Proximal claspette; *b*, distal claspette from behind; *c*, distal claspette from side.

Eretmapodites subsimplicipes Edwards.

Material examined consists of 10 males from Kilifi, Kenya, identified by Edwards and on dissections of male terminalia.

Adult.—As described by Edwards. The integument of the thorax is bright yellow or orange (in dried specimens) and there are more yellow scales mixed with the black, giving the thorax, to the naked eye, a much lighter appearance than the brownish appearance of the preceding species. Like *chrysogaster*, the extent of the yellow markings on the femora is variable, but the hind femora have more extensive pale areas than usually seen on *chrysogaster*. The specimens examined have from a half to three-quarters of the posterior surface of the hind femora pale below. All specimens examined have the two dorsal silvery spots on the first abdominal tergite, these spots being conspicuous and much more developed than those seen on male *chrysogaster*. *Terminalia* as in Edwards, but note that the distal claspette is not so obviously tapered as in Edwards' figure and the stalk is hollow and open at the back. In addition to the long stout hairs at the tip there is a patch of fairly long very fine hairs along the inside border of the claspette. The arm of basal lobe is hairy on the basal two thirds.

Eretmapodites semisimplicipes Edwards.

Material examined consists of 6 males from Bwamba and 20 males from Kaimosi, Kenya, and identified on dissections of male terminalia.

Adult.—As described by Edwards and Haddow. Haddow says that the integument of the scutum in fresh specimens does not appear darker than *chrysogaster*, but in the dried specimens available for examination the integument is on the whole darker than *chrysogaster*, but a few are lighter and a few are very dark brown, almost black. Legs with a variable amount of yellow scaling, hind femora pale on posterior surface on basal one-third to two-thirds and very often with a pale line below to tip. Occasionally the two dorsal spots on first abdominal tergite missing. *Terminalia* as in Edwards. The arm of the basal lobe of coxite hairy on the basal one-third.

FIG. 5.—*Eretmapodites gilletti* sp. n. Male terminalia. *a*, Distal claspette seen from side.

Eretmapodites gilletti sp. n.

Described from the holotype and 9 male paratypes from Bwamba. I can find no character which will serve to distinguish this species from *E. grahami* except for the male terminalia, which are immediately distinguished from *E. grahami* on the character of the distal claspette, and from the other species of the *chrysogaster* group by the very short arm of the basal lobe and by the shape and size of the distal and proximal claspettes.

Adult.—As in *grahami*, but the proboscis sometimes has a short, indistinct, pale line on the basal one third beneath. Legs dark with a varying amount of yellow below. In pale specimens the femora may be yellow below to tip and in dark specimens only to a half

or less ; sometimes there is a small white spot at tip of mid femora ; hind tarsi without feathering. The two dorsal silvery spots on first abdominal tergite sometimes missing. *Terminalia* (fig. 5). Style slender, and only slightly tapered and curved at tip, with a few scales and hairs on the basal half. Coxite covered with long hairs, three on the upper sternal aspect being slightly longer and stouter than the rest ; tergal flange not greatly projecting and with a double row of fine hairs on the border. Apical lobe with about 10 fairly long, curved, fine, simple hairs. Arm of basal lobe very short and hairy on the outside edge, terminal blade fairly long and slender. Proximal claspette small and flat, widening at the tip and with a row of about 9 stout inwardly curved bristles on the distal border. Distal claspette large and consists of a short stout stalk with an enlarged roughly oval tip, which is covered with short stout hairs, which are bent at the tip and terminate in a fine point. From tergal aspects the distal claspette is seen as a large densely hairy disc.

Eretmapodites grahami Theobald.

Material examined consists of 9 males from Bwamba identified on dissections of the male terminalia.

Adult.—As described by Edwards and Haddow, but one specimen with a distinct but narrow white line on the proboscis below on the basal three-quarters ; the proboscis of one other specimen has a narrow white line below on about the mid third. Legs pale on the posterior surface on basal one-to two-thirds. The abdomen sometimes lacks the 2 dorsal silvery spots on the first tergite. *Terminalia* as in Edwards, but the stem of basal lobe hairy.

Keys.

It is possible for one familiar with all species of the *chrysogaster* group to divide them into sub-groups which are useful for the preliminary sorting of the species, and the following table gives the external characters used for differentiating these sub-groups. It will not serve to differentiate the females of sub-groups (iii) and (iv) as they appear to be indistinguishable.

It must be emphasized, however, that two characters used in Table I, the colouring of the integument of the scutum and the degree of feathering on the hind tarsi, are given only as a help to preliminary sorting and not as definite diagnostic characters. The colour of the integument of the scutum is rather variable, depending on the freshness of the specimens examined, and unless

Table I.

Sub-group.	Proboscis.	Pleurae.	Scutum.	Hind Tarsi.
subsimplicipes	With a white line below	No scale patch above mid coxae	Orange-yellow to naked eye	Sparsely feathered
semisimplicipes	Ditto	With a scale patch above mid coxae	Velvety black to the naked eye	Ditto
chrysogaster and *intermedius*	,,	Ditto	Mid-brown	Heavily feathered
mahaffyi, *haddowi* and *harperi*	,,	,,	As above or paler	Sparsely feathered
grahami and *gilletti*	All black or pale line, short and indistinct	,,	Dark brown	No feathering

direct comparison is made it is probably not possible to estimate accurately the shades of colouring seen. The feathering on the hind tarsi must also be used with caution, as it is often difficult to judge the degree of feathering unless one is familiar with all the species of the *chrysogaster* group.

The final determination should be made on male terminalia and a new key, largely following Haddow's key to the male *Eretmapodites*, has been compiled to include the new species of the *chrysogaster* group and also *E. hightoni* sp. n. (van Someren, 1947, *Proc. R. ent. Soc. Lond.* (B) **16** : 15).

Key to the known males of *Eretmapodites*.

1. *apn* clothed with broad silvery scales . . . . . 2.
   apn clothed with narrow yellow scales . . . . . 23.
2. Scutum without ornamentation, the yellow and black scales evenly mixed throughout . . . . . 3.
   Scutum with some form of ornamentation, the yellow scales forming a border, a median line (perhaps faint and incomplete), or a pattern of stripes . . . . . 11.
3. Proboscis usually all dark ; hind tarsi simple . . . . . 4.
   Proboscis with a pale or white line beneath ; hind tarsi with the last two segments more or less feathered with outstanding scales . . 5.
4. No proximal claspettes . . . . . *grahami* Edwards.
   Small proximal claspettes present . . . . . *gilletti* sp. n.
5. Dark species, the scutum appearing almost black to the naked eye ; feathering of tarsi relatively slight . . . . *semisimplicipes* Edwards.
   Lighter species, the scutum appearing light or medium brown to the naked eye . . . . . 6.
6. Either no silvery scales above mid coxa or these scales forming a small patch of not more than 5 scales . . . . . *subsimplicipes* Edwards.
   With a distinct patch of silvery scales above mid coxa . . . . 7.
7. Proximal claspettes large with a greatly enlarged flattened tip which is covered with long, simple, curved hairs . . . . . *haddowi* sp. n.
   Proximal claspettes small and short with the tip only slightly enlarged 8.
8. Distal claspette with the greatest width of the enlarged tip about the length of the coxite . . . . . *mahaffyi* sp. n.
   Distal claspette with the greatest width of the enlarged tip about half the length of the coxite . . . . . 9.
9. Distal claspette flat ; enlarged tip with a patch of hairs apically *chrysogaster* Graham.
   Distal claspette with the stalk hollow and open at the back ; flat top of enlarged tip wholly covered with hairs . . . . . 10.
10. Stalk of distal claspette visible from tergal aspects ; flat top of enlarged tip covered with short, fine, straight hairs . . . . . *harperi* sp. n.
    Only flat top of distal claspette seen from tergal aspects and this disc covered with long curved hairs . . . . . *intermedius* Edwards.
11. Scutum with ornamentation a complete or incomplete median yellow line (perhaps faint and indistinct) or a yellow lateral border with or without an incomplete posterior median stripe . . . . . 12.
    Scutum with ornamentation a distinct pattern of light and dark stripes 14.
12. Hind tibia simple ; hind tarsi feathered ; some *chrysogaster* group . 5.
    Hind tibia enlarged at tip, with prominent scales forming a tuft ; hind tarsi simple . . . . . 13.

13. Scutum with a complete yellow median line
silvestris Ingram and De Meillon.
Scutum with a short yellow median line anterior to the scutellum, and a median yellow line extending back a short distance from the anterior scutal margin, or with the only ornamentation a yellow border . . . . . *silvestris* subsp. *conchobius* Edwards.
14. Yellow stripes narrow (general appearance of scutum dark with a pattern of yellow lines) . . . . . 15.
Yellow stripes much broader (general appearance of scutum yellow with a pattern of dark stripes) . . . . . 20.
15. A large tuft of projecting scales present on the inner sternal aspect of the coxite . . . . . 16.
This tuft absent, or represented by a very few scales which do not form a definite tuft . . . . . 18.
16. Basal lobe of coxite with prominent rows of large scales; proximal claspettes large but of simple form, bearing hairs with enlarged spatulate tips . . . . . *argyrurus* Edwards.
Basal lobe of coxite absent . . . . . 17.
17. Scale-tuft on inner sternal aspect of coxite composed of lanceolate scales; proximal claspettes large but of simple form and covered with disciferous hairs . . . . . *quinquevittatus* Theobald.
Scale tuft on inner sternal aspect of coxite mainly composed of scales which are broadly rounded at the tip, but a few of them are pointed; proximal claspettes large and of peculiar shape, bearing numerous disciferous hairs . . . . . *tonsus* Edwards.
18. Distal claspettes bent almost at right angles in the middle
forcipulatus Edwards.
Distal claspettes not markedly angled in the middle . . . . . 19.
19. Proximal claspettes small and pointed, with at most a single hair at the tip . . . . . *inornatus* Edwards.
Proximal claspettes very large, bearing numerous disciferous hairs
penicillatus Edwards.
20. Seventh abdominal tergite with the black scales more or less appressed, not forming a prominent ruff; coxite with a conspicuous scale tuft on the inner sternal facet . . . . . *quinquevittatus* Theobald.
Seventh abdominal tergite (and at least 6th and 7th sternite) with a fringe of prominent black scales forming a distinct ruff; coxite without a scale tuft . . . . . 21.
21. Basal lobes without sigmoid hairs; distal claspettes with a patch of short, enlarged-tipped hairs below and a few long simple hairs above
dracaenae Edwards.
Basal lobes with a terminal row of sigmoid hairs with harpoon-shaped tips; hairs of distal claspettes not as above . . . . . 22.
22. Enlarged tip of distal claspettes small and inconspicuous (greatest width equal to about half the length of the coxite) and with a patch of short simple hairs below and a few long, distally serrated hairs above . . . . . *ferox* Haddow.
Enlarged tip of distal claspettes large and conspicuous (greatest width equal to the length of the coxite) and densely covered with delicate enlarged-tipped hairs . . . . . *hightoni* sp. n.
23. Scutum with a pattern of narrow yellow lines as in the *E. inornatus* group; hind tarsi with white tips *leucopus* subsp. *productus* Edwards.
Scutum with a pattern of much broader yellow lines, as in the *E. quinquevittatus* group; hind tarsi all dark or with white tips. . . . 24.

24. Hind tarsi entirely dark ; the last two segments feathered and angled 25.
Hind tarsi with white tips ; the last two segments simple . . . . 28.
25. One claw of middle tarsi broad and blade-like, tarsal feathering pronounced . . . . . 26.
Both claws of middle tarsi slender as usual ; tarsal feathering slight and not very conspicuous . . . . . 27.
26. Fifth mid-tarsal segment shorter than the fourth ; tip of distal claspettes with about 10 reflexed hairs ; basal lobe of coxite without scales . . . . . *oedipodius* Graham.
Fifth mid-tarsal segment as long as fourth ; tip of distal claspettes with about 15 reflexed hairs ; basal lobe of coxite with a few, narrow, pointed scales . . . . . *oedipodius* subsp. *stanleyi* Edwards.
27. Reflex hairs of distal claspettes in a regular series ; proximal claspettes with a broad, axe-shaped terminal leaf *oedipodius* subsp. *parvipluma* Edwards.
Reflexed hairs of distal claspettes crowded at tip, proximal claspettes with narrow, pointed terminal leaf *oedipodius* subsp. *wansoni* Edwards.
28. Third hind tarsal segment all dark. . . . . 29.
Third hind tarsal segment white at tip . . . . . 30.
29. Distal claspette shorter than proximal claspette and bearing a few simple hairs at tip . . . . . *leucopus* Graham.
Distal claspette longer than proximal claspette and bearing two long, flattened sigmoid setae at the tip *leucopus* subsp. *productus* Edwards.
30. Coxite with a small external projection ; basal lobe with three very long and slender scales and some hairs at the tip . *plioleucus* Edwards.
Coxite without an external projection ; basal lobe with three scales, one much broader than the others, at tip, and without hairs *plioleucus* subsp. *brevis* Edwards.

Acknowledgments.

I have much pleasure in naming the four new species of *Eretmapodites* described here after Dr. Mahaffy, former Director, and Dr. Haddow, of the Yellow Fever Research Institute, Entebbe, Uganda, Mr. Harper (Medical Department, Kenya) and Mr. Gillett (Medical Department, Uganda), who are most associated with the entomological work of Bwamba County and to whom I am indebted for most of my specimens. I also wish to thank Dr. Mahaffy and Dr. Haddow for facilities accorded me while collecting in this area.

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NOTES ON THE ODONATA OF MAURITIUS.

1. THE GENUS *HEMICORDULIA* SELYS.

By Lt.-Col. F. C. Fraser, F.R.E.S.

The late Mr. J. E. H. Roberts delegated to me the task of reporting on a series of collections of Odonata made by Mr. J. Vinson in the island of Mauritius. As further collecting is being carried out by Mr. Vinson and more material continues to reach me I have decided to act on Mr. Roberts' suggestion and to deal with individual genera in a series of short papers, instead of reporting on the collections as a whole. A discussion of the Odonate fauna of Mauritius will form the subject of a final and longer paper.

This first paper deals with the genus *Hemicordulia* Selys, a dominant one in the family Corduliidae, probably on account of the strong migratory tendencies of some of its species and their very wide distribution. The genus is essentially a Papuan one, but one species at least, *H. asiatica* Selys, has extended into continental Asia and spread right across to the Western Ghats of India and Ceylon. Two others, concerning which there is good evidence to show that they are lineal descendants of *H. asiatica*, are found in the Mascarene islands and Madagascar, viz. *H. virens* (Rambur) reported only from Mauritius, and *H. similis* (Rambur) from Madagascar and the Seychelles : in all probability *H. similis* will also be found to occur in Mauritius. Both sexes of *H. similis* have been described somewhat imperfectly, but only the female of *H. virens* was known hitherto. Recently Mr. Vinson has taken both sexes of this rare insect and so it is now possible to complete the descriptions. Species of *Hemicordulia* breed in still waters, weedy ponds, lakes or even marshes being preferred, but I have found that in the absence of these, *H. asiatica* will take to breeding in the deep still pools of rivers, as in the Annaimallai Hills of south-west India. This species breeds at altitudes varying from 3000 to 7500 ft. in the Nilgiri and Palni Hills, S. India, but *H. virens* and *H. similis* both breed at much lower levels. The descriptions of these two species follows.

Hemicordulia similis (Rambur).

Cordulia similis Rambur, 1842, *Ins. Nevrop.* : 147 (Descr. ♀).
Hemicordulia ? similis Selys, 1869, Pollen and Van Dam, *Madagascar Ins.*: 23.
Hemicordulia ? similis Selys, 1871, *Bull. Acad. Belg.* (2) **31** : 252.
Hemicordulia ? similis Kirby, 1890, *Cat. Odon.* : 47.
Hemicordulia delicata Martin, 1896, *Mem. Soc. zool. France* **9** : 105.
Hemicordulia similis Martin (pars), 1906, *Cat. Coll. Selys, Cordulines* : 14.

Male.—Abdomen 32–36 mm. Hind wing 30–32 mm.

Head : labium olivaceous, labrum and epistome uniform brownish yellow or the base of labrum may be darker ; frons in front and laterally bright citron yellow, the upper surface and vesicle brilliant metallic peacock blue, occiput brown, eyes probably blue or

green during life. Prothorax pale brown, the anterior collar yellow. Synthorax reddish brown, the upper half of dorsum metallic peacock-blue, mesepimeron bright citron yellow encircled broadly by brilliant metallic peacock-blue, the metepimeron similar but the metallic colour deficient posteriorly and above or there is only a slight metallic reflex posteriorly. The space between the metallic ovals narrowly citron yellow above, reddish brown below. Yellow beneath with a dark transverse line posteriorly. Legs very long and very slim, black, the anterior femora alone ferruginous or ochreous. Wings hyaline; pterostigma blackish brown, very small, barely 1·25 mm. in length; 7 antenodals and 5 or 6 postnodals in forewings, 5 antenodals and 7 postnodals in the hind; discoidal cell in hindwing usually slightly proximal of arculus; 16 or 17 cells in anal loop; membrane short, white. Abdomen dark steely black or with a violaceous reflex on dorsum, this expanding on to sides at the jugal sutures and again at apical ends of segments 3 to 5 and at apical ends only of 6 to 9 and enclosing elongated ventro-lateral spots of bright ochreous; beneath, ochreous with black annules at the junction of segments. Segments 1 and 2 broadly yellow laterally, the latter segment with a narrow black ventro-lateral stripe with metallic blue reflex. Anal appendages and whole of segment 10 black; superiors at least three times as long as segment 10, cylindrical, with only a single outward convexity which is limited to the basal half of appendage, which is thereafter directed straight posteriorly and the two appendages, in this portion, rather closely apposed and strictly parallel. Inferior nearly of the same length, about one sixth shorter and with the apex curled up abruptly, as in *H. virens*.

Female.—Abdomen 35 mm. Hind wing 31 mm.

Coloured and marked exactly similar to the male. Wings, in the teneral stage at least, hyaline, uncoloured save at the extreme base, where amber rays extend in the subcostal and cubital spaces to as far as the first antenodal and to the end of membrane in the hind wing. The end of the abdomen stouter and shorter than in *H. virens*, the genital valve at least three-fourths the length of segment 9, its base prolonged and with an angulated ridge basally; its apex very narrowly bifid and for only about one-fifth the length of valve; apical border of segment 9 strongly convex, not advanced at its medial part, as in *H. virens*. Anal appendages fusiformly cylindrical, slightly longer than segments 9 and 10 taken together.

Habitat: Madagascar; Ambohimangam, 4 pairs, 4.xii.46, collected by Prof. J. Millot, to whom I am indebted for one pair. All, unfortunately, are rather teneral, so that it is impossible to say if the wings will develop any amber tinting later on in life. Rambur's holotype female is in the Selysian collection along with 4 males; I have not seen these latter, but from Martin's account in the *Cat. Coll. Selys*, it would appear that they are made up of large and small specimens, the former probably *H. virens*, the latter *H. similis*. A male in the Ris collection, presented to him by Martin, belongs to the small series and is correctly described by Ris as *H. similis*. This is evident from the description of the lateral ochreous markings on segments 4 and 5, their obsolete or narrow character being due to the encroachment of the dorsal black on the sides at the jugal suture as well as at the apical end of segments; the length of the abdomen is also given as only 30 mm., which is correct for *H. similis*, but not for *H. virens*. *H. similis* is a much more distinctive species than *H. virens* and it is easily distinguished both from that species and from *H. asiatica*. Its smaller size, the brightly contrasted yellow and green metallic markings on the sides of the thorax, the lower nodal index and lastly the parallel condition of the apical portions of the anal appendages of the male easily serve to separate that sex, whilst the striking character of the elongated genital valve renders confusion of the females impossible.

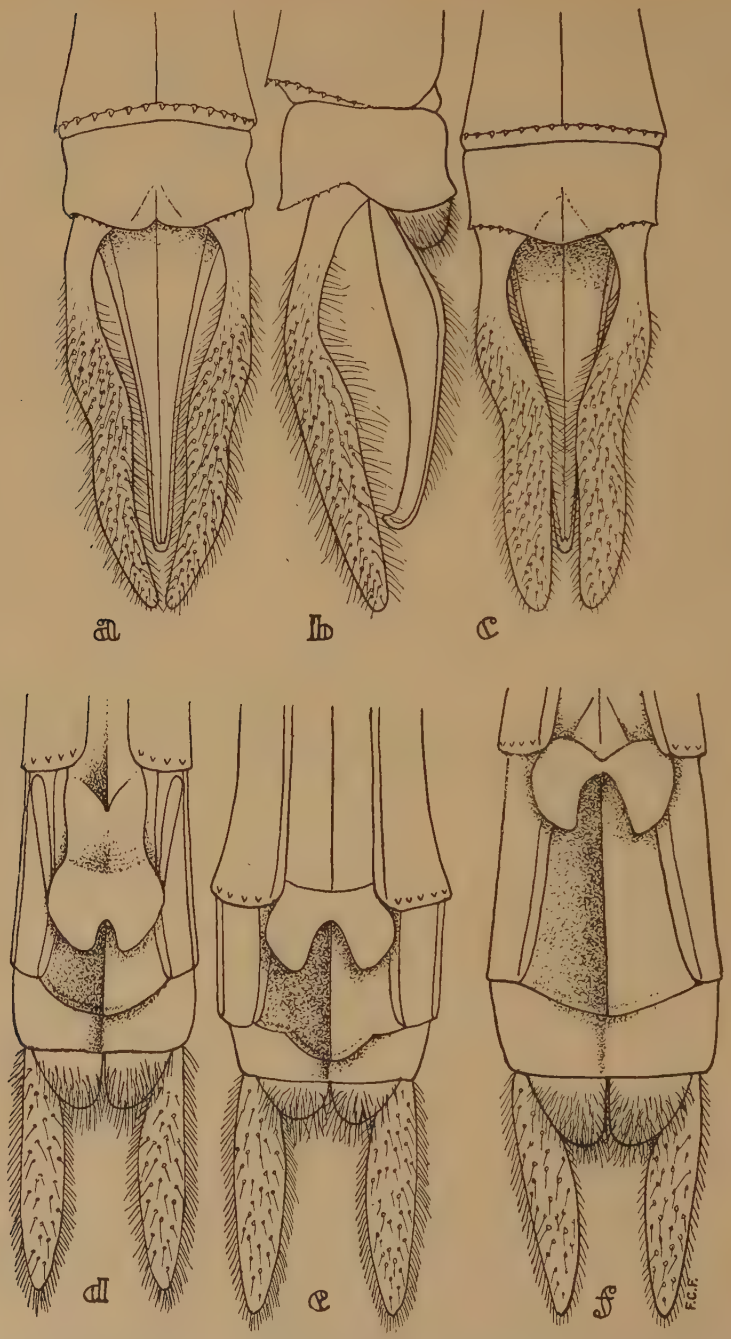

FIG. 1.—(*a*) Anal appendages of *Hemicordulia virens* (Rambur), dorsal aspect. (*b*) Right lateral aspect of same. (*c*) The same of *Hemicordulia similis* (Rambur), dorsal aspect. (*d*) Female genitalia of *Hemicordulia similis*. (*e*) The same of *H. virens*. (*f*) The same of *Hemicordulia asiatica* Selys.

Hemicordulia virens (Rambur).

Cordulia virens Rambur, 1842, *Ins. Nevrop.* : 147 (Descr. ♀).
Hemicordulia ? virens Selys, 1869, Pollen and Van Dam, *Madagascar Ins.* : 23.
Hemicordulia ? virens Selys, 1871, *Bull. Acad. Belg.* (2) **31** : 253.
Hemicordulia ? virens Selys, 1874, *Bull. Acad. Belg.* (2) **37** : 18.
Hemicordulia virens Kirby, 1890, *Cat. Odon.* : 47.
Hemicordulia virens Martin, 1906, *Cat. Coll. Selys, Cordulines* : 14.

Male.—Abdomen 36–38 mm. Hind wing 35 mm.

Head : labium dull yellow, labrum bright ochreous, epistome brownish yellow, frons and vertex brilliant emerald green metallic, the lower border of frons margined narrowly with ochreous, occiput brown ; eyes most certainly emerald green during life. Prothorax brown, posterior lobe evenly rounded, depressed. Synthorax pale yellowish brown or dull ochreous, the upper third of dorsum, a diffuse area on the upper half of humeral suture and the upper anterior half of metepimeron brilliant emerald green metallic ; the mesepimeron also has a golden or coppery metallic reflex over its lower half in certain lights. The whole thorax coated with fine short downy hair, especially thick on dorsum. Legs very long and slender, black, the anterior femora, the extensor surface of the middle femora and the knees of the hind bright ferruginous. Wings hyaline, the extreme base of hind tinted with amber, membrane brown, its base white ; pterostigma blackish brown, very short, covering less than 1 cell ; 8 antenodals in forewings, 6 in hind, 6 postnodals in forewing, 8–9 in the hind, 18–19 cells in the anal loop, 3 cells in subtriangle, the rest of the venation closely similar to that of *H. asiatica* Selys. Abdomen steely or bronzed black on dorsum sometimes with a dark violaceous reflex, the lower part of sides bright ochreous, but the black of dorsum on segments 4 to 8 extending on to sides rather broadly at the apical ends so as to interrupt what would otherwise be a continuous lateral yellow stripe ; beneath ochreous, the apical black extending diffusely on to ventrum on segments 4 to 7. Segments 9 and 10 entirely black. Anal appendages black ; superiors at least three times as long as segment 10, cylindrical and very sinuous, with a double convexity outwards, the apices gradually tapered and a little obtuse ; inferior about one-fifth shorter, an elongated triangular structure with its extreme apex sharply upturned.

Female.—Abdomen 38 mm. Hind wing 34 mm.

Coloured and marked exactly similar to the male. Wings deeply tinted with amber throughout, but more deeply so in the subcostal and cubital spaces of fore wings and to as far posteriorly as the end of membrane in the hindwings to about the level of the 1st antenodal and half way to discoidal cell. Anal appendages black, about as long as the combined length of segments 9 and 10, cylindrical and fusiform, tapering both basally and apically, the apices slightly obtuse. Genital valves short and deeply bifid, but not quite to base, about half the length of segment 9, the apical border of which is markedly crenate and produced medially.

Habitat : MAURITIUS ; Moka, 2 ♂, 6.xii.45 and 10.xii.46 ; 2 ♀, 30.vi.45 and 20.xii.46, all coll. J. Vinson. The June female is fully adult, with deeply tinted wings, all others are subadult, but one male approaching adultage. The holotype female is in the Hope collection, Oxford, and there is another female in the Paris Museum collection, formerly in the Martin collection. The male described above was hitherto unknown and appears to have been confused with that of *H. similis*, its near relative, from which it is distinguished by its larger size and more robust build, the male by its sinuous anal appendages and higher nodal index ; the female by the latter character and by the short genital valve which is only half the length of segment 9 and more deeply bifid. Very little separates this species from *H. asiatica* Selys ; the anal appendages are perhaps rather longer and more sinuous and the wings always bear some colour-

ing, at least at the base, whereas there is never any trace of this in the males of *H. asiatica*; the females of the latter species have the genital valve still shorter and bifid almost to the base. The venation and colouring are identical in the two species, but the female of *H. virens* always has rather extensive colouring of the wings, in striking contrast to the colourless or almost colourless wings of female *H. asiatica*. Thus whilst it might be difficult to differentiate between the males of the two species, especially if at all teneral, there is never any difficulty in separating the females.

A REVISION OF THE SPECIES OF THE GENUS *ASPIDOPTERA* COQUILLETT, WITH SOME NOTES ON THE LARVA AND THE PUPARIUM OF *A. CLOVISI*, AND A NEW SYNONYM (DIPTERA, STREBLIDAE).

By B. Jobling, F.R.E.S.

(*Wellcome Entomological Field Laboratories.*)

This revision was undertaken in order to establish the identity of *Aspidoptera phyllostomatis* Perty, and also to give an illustrated redescription of all the other known species, based upon a new morphological character which has been found during my study of these parasitic Diptera. As in all my previous papers, the redescription was made from specimens mounted on slides, in Canada balsam. I take this opportunity to express my thanks to Mr. H. Oldroyd, for granting me facilities for examination of the specimens in the collection of the British Museum (Natural History). I am also very grateful to Dr. E. A. Chapin, of the United States National Museum, for the information concerning the type of *Aspidoptera busckii* Coquillett, and to Dr. A. Stone, at the same Institution, for the comparison of my specimen of *Aspidoptera phyllostomatis* Perty with this type.

The genotype, *Lipoptena phyllostomatis* Perty, was described by Perty (1830) from *Phyllostomus* sp. of Brazil.

Kolenati (1857, *Die Parasiten der Chiropteren*) published the description of this species from Perty's work and reprinted his drawing. But in his later paper (1863) he separated the Streblidae from the Hippoboscidae and included *L. phyllostomatis* Perty in the key to the Streblidae.

Coquillett (1899) described a second species *busckii*, for which he erected the genus *Aspidoptera*.

A year later Speiser (1900*a*) described another new species, *megastigma*, and redescribed *phyllostomatis* Perty from the two specimens at the Berlin Museum. Speiser could not compare these two specimens with the type as this had already been lost. He was also unable to consult the paper of Coquillett, and therefore erected for these two species the genus *Lipopteryx*. In his other paper (1900*b*) he sank this generic name into the synonymy of *Aspidoptera*, and made *A. busckii* Coquillett a synonym of *A. phyllostomatis* Perty.

An examination of the specimen which has been compared with the type of *A. busckii* Coquillett, shows clearly that Speiser was correct as regards the identity of this species with *A. phyllostomatis* Perty. It is the only species in which the eyes are composed of a number of facets, and of which the hairy wings have the same structure as shown by Speiser (1900*a*, fig. 4, p. 49), and the same length in relation to the thorax as stated by Perty.

The conclusion of Speiser is also supported by the distribution of the species of this genus among the hosts. Thus, *A. megastigma* is restricted to a single species of bat, *Noctilio leporinus* L.; the principal hosts of *A. clovisi* are the two species of the genus *Anoura*, and it also occurs on the genus *Sturnia*; *A. phyllostomatis* parasitizes the genus *Phyllostomus* and *Artibeus*; *A. minuta*

occurs on one species of the genus *Tonatia* and on the genus *Phyllostomus*. It is seen that of the four known species of *Aspidoptera* only *A. minuta* occurs on the genus which is also parasitized by *A. phyllostomatis*. However, *A. minuta* is a very different species. It is much smaller than *A. phyllostomatis*, its wings are not hairy and they are widely separated from each other ; not close together as shown in the drawing of Perty and Speiser.

It must be noted that Kessel (1925) erroneously referred to *A. phyllostomatis* forms which do not belong to this species. I have re-examined the specimens in question in the collection of the British Museum (Natural History), and have found that they all belong to the species which was subsequently described by Pessôa and Guimãraes (1936) as *A. clovisi*.

The genus *Aspidoptera* is more or less close to *Trichobius* Gervais and *Joblingia* Dybas and Wenzel. From the first genus it can be easily separated by the greatly reduced wings, which in only two of the species have six longitudinal veins, as those of many other American STREBLIDAE. From the second genus it differs by the distinct, sclerotized subregions of the dorsal surface of the head and by the short, strong legs, of which the tibiae are as long as or a little longer than the tarsi. The thorax and especially the head of *A. megastigma* resemble those of the genus *Paradyschiria* Speiser. But this genus is wingless, the femora of its fore-legs are much stronger than those of the other legs, and all the tibiae have a lightly pigmented ring, which is absent in *Aspidoptera*.

Key to the Species of the Genus *Aspidoptera* Coquillett.

1. Median suture of prescutum extending to the mesonotal suture . . 2
   Median suture extending to the scutellum. Mesonotal suture indistinct (fig. 4) . . . . . *A. minuta* Costa Lima.
2. Median and mesonotal sutures forming an inverted T. Wings with six longitudinal veins, overlapping the anterior part of abdomen . . 3
   Median and mesonotal sutures forming an inverted Y. Wings almost vertical, with thick margins, and with one thick and another much thinner greatly modified longitudinal veins (fig. 3) *A. megastigma* Speiser.
3. Eyes faceted. Scutellum rhomboidal, with four setae. Tibiae with very short thin setae (fig. 1) . . . . . *A. phyllostomatis* Perty
   Eyes not faceted and not very conspicuous. Scutellum broadly rounded, with six setae. Tibiae with long setae (fig. 2) *A. clovisi* Pessôa & Guimãraes.

Aspidoptera phyllostomatis (Perty, 1830). (Fig. 1.)

Lipoptena phyllostomatis Perty, 1830.
Aspidoptera busckii Coquillett, 1899.
Lipopteryx phyllostomatis Speiser, 1900*a*.
Aspidoptera phyllostomatis Speiser, 1900*b*.

Body 2 mm. long in male. *Head* broader in the anterior than in the posterior part ; anterior margin of frons slightly produced in the middle ; dorsal surface of laterovertices with five strong setae ; mediovertex broad, depressed ; occipital sclerotized parts convex, with rounded posterior margin and with six dorsal and a few lateral setae ; lateral margin of genae bears a few moderately long setae. Eyes faceted. Ventral surface of head with moderately long, thin setae along the inner margin and smaller ones laterally. Palpi broadly rounded ; their anterior margin bears two long and a few much shorter setae, their

ventral surface with very small setae. Theca of labium more or less dome-shaped; labella one-third of the length of the theca (fig. 1, B).

Thorax.—Median and mesonotal sutures forming an inverted T. Mesonotum flat; prescutum with much stronger setae in the anterior than in the posterior part; scutum with small, thin setae in the anterior part and in the middle, and with strong setae near the

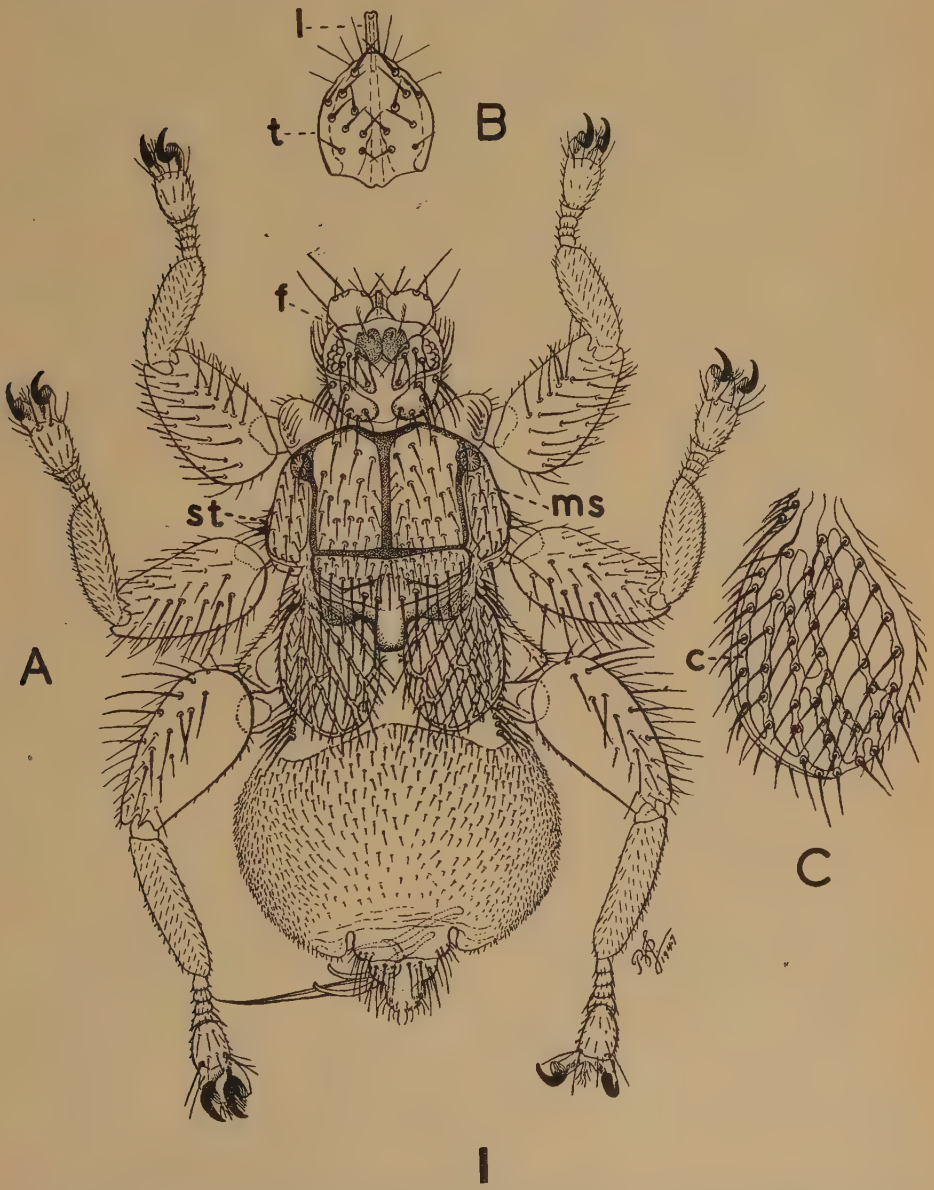

FIG. 1.—*Aspidoptera phyllostomatis* Perty. A, Dorsal view of male; B, labium; C, wing; *c*, costal vein; *f*, frons; *l*, labella; *ms*, mesopleuron; *st*, sternopleuron; *t*, theca of labium.

scutoscutellar suture ; scutellum rhomboidal, with four very strong setae ; mesopleura broad (*ms*), with setae of the same length as those arising from the middle part of the prescutum. Prothoracic spiracles large, rounded. Ventral surface of thorax flat, with many minute setae ; posterolateral part of each sternopleuron (*st*) slightly projecting beyond the lateral margin of mesopleuron when the thorax is viewed dorsally. Legs very strong ; tibiae pubescent ; femora of the fore and the middle legs with strong setae in the dorso-posterior part ; femora of the hind legs with similar setae in the dorso-anterior part.

Wing 0·5 mm. long, broad, approximated and overlapping tergite one + two, with six longitudinal and three cross veins ; costal vein (*c*.) extending to the fourth longitudinal vein ; costal margin bears small, dark setae ; the inner margin with small, thin setae ; costal and all the longitudinal veins bear long setae (fig. 1, c).

Abdomen of male spherical and very setous ; lateral parts of tergite one + two with strong setae ; second sternite with a triangular patch of small setae in the middle, and with slightly longer setae on the posterior margin, its lateral parts broadly rounded. Hypopygium as shown in the drawing.

Perty's and Speiser's specimens were taken from *Phyllostomus sp.*, in Brazil and Cuba respectively ; that of Coquillett, from *Artibeus sp.*, in Porto Rico. Specimen in my collection has been found on *Phyllostomus sp.*, at Humboldt, Brazil. Dr. A. Stone very kindly informed me that there are two specimens in the United States National Museum, of which one was collected at Alhajuelo, Panama, and another from *Artibeus lituratus* Lichtenstein, at Sapucay, Paraguay.

Aspidoptera clovisi Pessôa & Guimarães, 1936. (Fig. 2.)

Body 1·2–1·3 mm. long in male and 1·8 mm. in female. *Head* slightly broader in the middle than in the anterior and especially in the posterior part ; the middle part of the anterior margin of frons straight ; laterovertices with five setae, their posterior narrow parts parallel ; occipital sclerotized parts flat, with five dorsal setae, their posterior margin festooned and bears three moderately strong setae ; lateral margin of each gena with a few setae. Eyes small, unfaceted (fig. 2, *e*). Ventral surface of head with a few very small setae. Palpi cordiform when examined ventrally ; their anterior margin bears four long and a few very small setae ; their ventral surface with very small, thin setae and one very much stronger seta laterally near the base (fig. 2, *p*). Theca of labium dome-shaped, labella about one-third of the length of the theca.

Thorax.—Mesonotum flat ; anterior part of the median suture bifurcated ; mesonotal suture curved, and together with the median suture forming an inverted T. Prescutum, scutum and mesopleura bear uniform setae ; scutellum with six setae and with broadly rounded posterior margin. Prothoracic spiracles small, elliptical. Ventral surface of thorax flat and bears many very small setae ; each sternopleuron forming a short conical process which slightly overlaps the coxa of the fore leg. Legs strong ; tibiae bear long, thin setae ; dorsal surface of femora with many setae of the same length as those on the prescutum.

Wings 0·2 mm. long, widely separated, projecting as far as the middle of the tergite one + two, with six longitudinal and one cross veins ; sixth longitudinal vein forming the posterior margin of the wing ; all longitudinal veins bear long setae.

Abdomen of the gravid female ovoid and that of the non-gravid one more or less cordiform ; its dorsal surface bare in the middle ; its lateral and ventral surfaces with small setae. Tergite one + two with setae of the same type as those arising from the dorsal surface of femora. Second sternite triangular, with triangular patch of small setae in the middle and slightly longer setae in the postero-lateral parts and along the posterior margin. Sclerotized parts of the seventh sternite with many long setae. Apical cone of abdomen as long as broad, with four moderately long, thin setae.

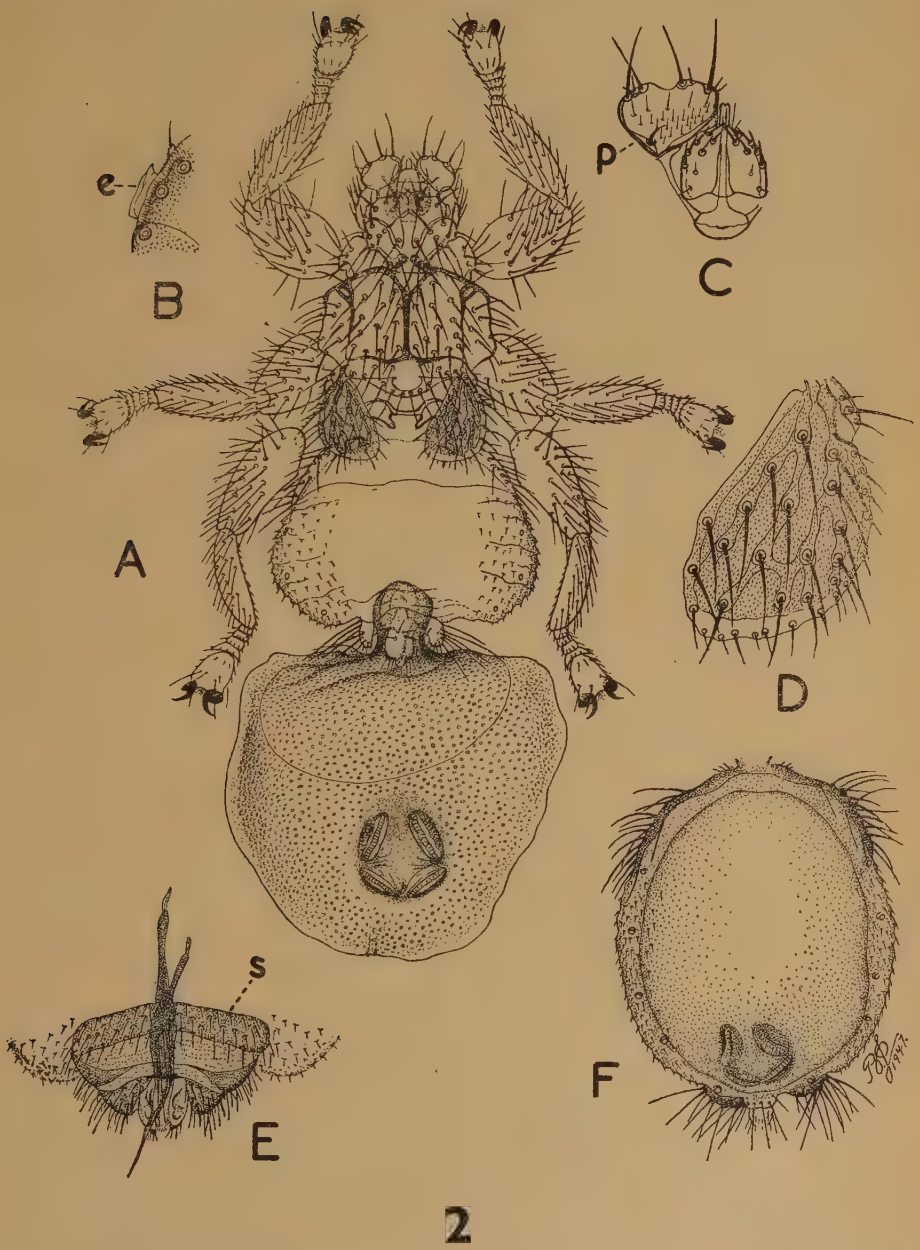

FIG. 2.—*Aspidoptera clovisi* Pessôa & Guimarães. A, Dorsal view of female with almost completely expelled larva; B, part of vertex with eye (*e*); C, labium and palp (*p*); D, wing; E, hypopygium with seventh sternite (*s*); F, abdomen of female with almost fully grown larva.

Hypopygium of the male abdomen broadly conical. Its structure is shown in the drawing 2, E, together with the seventh sternite (*s*).

The holotype, allotype and paratypes were taken from *Anoura geoffroyi geoffroyi* Gray, in Brazil. It has also been found on the same host in Trinidad ; on *Anoura geoffroyi peruana* Tschudy (syn. *A. geoffroyi apollinari* Allen), at Bogota, Colombia ; and on *Sturnia lilium* Geoffroy, in Paraguay.

The drawing 2, A was prepared from the specimen fixed during the expulsion of the fully grown larva from the uterus. The position of the anterior part of the larva, which lies in the vagina, shows that during the expulsion the body of the larva undergoes a very considerable constriction. It is more probable that the larva is squeezed out of the female by contraction of the muscles of the uterus and by peristaltic movement of the vagina. The drawing 2, F shows an almost fully grown larva in the uterus of the abdomen of the female. The larva of this stage has already been described by Guimarães (1944), from dissected specimens. Its body is ovoid when examined dorsally, but when viewed laterally it is more or less pyriform. As far as it is possible to see in my specimen, its spiracles slightly protrude into the lumen of the anterior part of the vagina, through which it breathes during its uterine life.

Immediately after expulsion from the uterus the form of the larva is altered and its skin is transformed into the hard, darkly pigmented puparium. These changes are quite distinct in the present specimen, which already resembles more the puparium than the larva. It has the dorsal surface convex and tuberculated ; in the posterior part there are present four spiracles, which are situated close together on a short, pigmented elevation. The anterior spiracles are narrowly ovoid, whereas the posterior ones are spindle-shaped. A very thin, circular line in the anterior part is the suture, along which the future operculum is separated by the emerging fly from the rest of the puparium. The ventral surface is flat and smooth ; its edge, as in the puparia of the other STREBLIDAE and the NYCTERIBIIDAE, is slightly produced beyond the convex dorsal surface and forms a flattened rim. In the posterior part of this surface there is situated the rudimentary anus, which resembles a very small papilla. It consists of a very small, narrow ring, which bears very few minute hairs. As the puparium is not completely formed I do not give its measurement. The length and the width of the larva has been found to be 0·88 and 0·68 mm. respectively.

A. megastigma Speiser, 1900. (Fig. 3.)

Body 2·1–1·6 mm. in female and male respectively. *Head* broader in the anterior than in the posterior part, anterior margin of frons very broadly rounded ; lateravertices trapezoidal, strongly sclerotized, with one very strong and four smaller, varying in length, setae ; occipital parts strongly sclerotized, with three very strong and two much weaker setae ; mediovertex rather broad. Each eye consists of a single large facet. Lateral margin of genae with three or four setae. Ventral surface of head with small setae along the inner margin and a few slightly smaller setae laterally. Palpi almost rounded, with three long and a few very short setae arising from their margin ; their ventral surface without setae. Theca of labium cordiform ; labella one-third of the length of the theca.

Thorax.—Mesonotum convex. Median and mesonotal sutures forming an inverted Y. Prothoracic spiracles very large, rounded. Prescutum with very few setae ; scutum with a very strong seta in each antero-lateral part, and with four small and two moderately strong setae in the middle ; scutellum very small, indistinctly separated from the scutum,

with two strong setae ; mesopleura bare ; each pteropleuron with a very strong seta projecting postero-laterally. Ventral surface of thorax with only a few minute setae ; each sternopleuron projecting laterally far beyond the lateral margin of the mesopleuron. Legs strong ; dorsal surface of tibiae with two or three rows of very small setae ; femora with strong setae dorsally ; coxa of the middle legs visible from above.

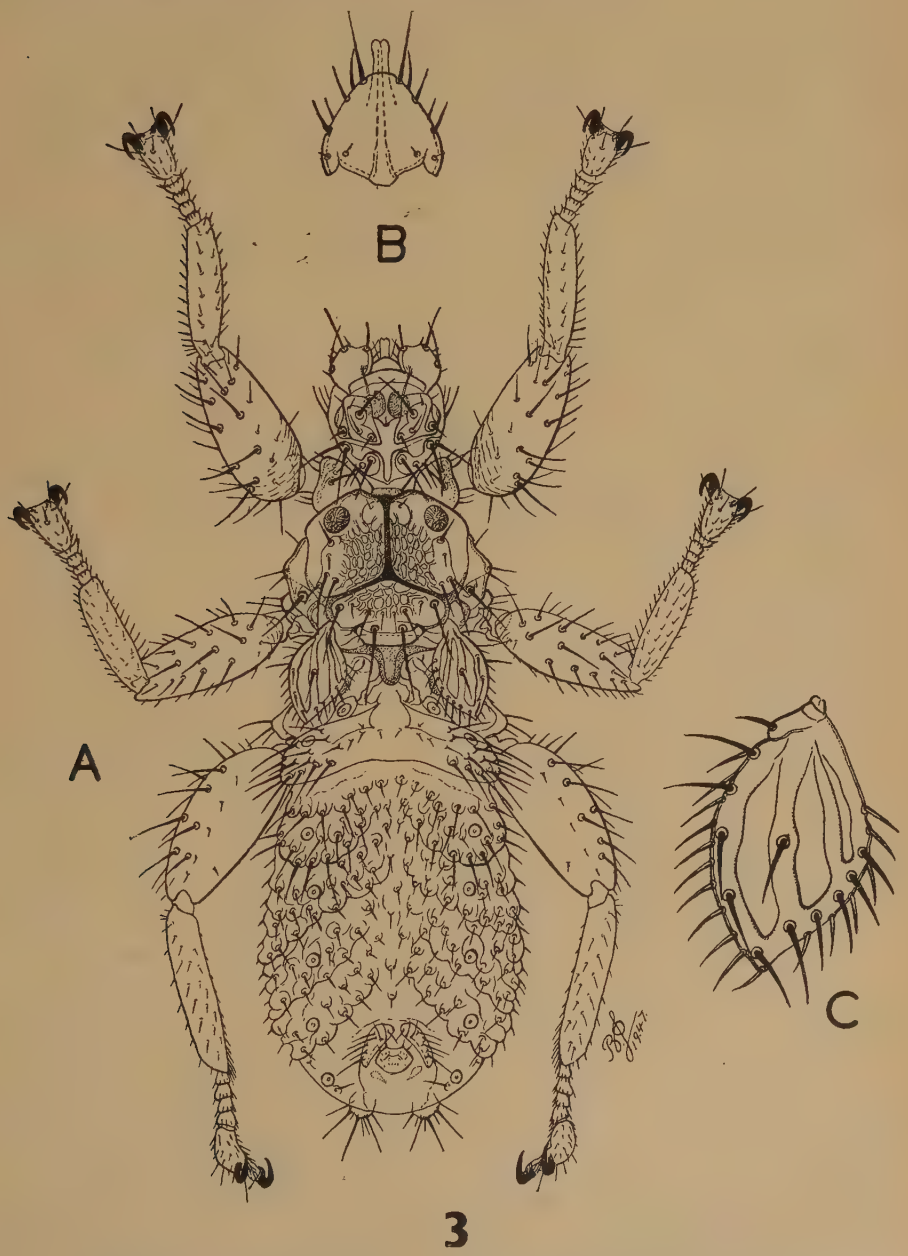

Fig. 3.—*Aspidoptera megastigma* Speiser. A, Dorsal view of female ; B, labium ; C, wing.

Wings 0·3 mm. long, almost vertical, with pointed apex, very thick margins and with one very broad and another narrower greatly modified longitudinal veins.

Abdomen sacciform; its surface bears many short but rather stout setae arising from lightly pigmented and projecting thecae. Tergite one + two with small setae in the middle and strong setae in the lateral parts; lateral parts of the third tergite festooned, with strong setae; the following tergites indicated by festooned diagonal folds; seventh tergite reduced to two sclerotized, setous plates, which lie anteriorly to the apical cone, which is dorsal; second sternite large, occupying one-third of the ventral surface, with a row of small setae across the middle and with long marginal setae; seventh sternite reduced to two rounded, sclerotized plates, which bear a few strong marginal setae and projecting beyond the posterior margin of the abdomen.

Abdomen of male much smaller than that of the female, without third tergite and the festooned diagonal folds. It ends in a semispherical, sclerotized hypopygium, of which the surface bears many thin setae.

In all the matured specimens of this species the middle part of the mesonotum and that of the sternopleura are strongly reticulated, but in the very young specimens the reticulation is absent.

This species parasitizes only one species of bat, *Noctilio leporinus* L. (syn. *N. dorsatus* Wied.), from which it has been recorded in Cuba, Trinidad and in Venezuela.

A. minuta Costa Lima, 1921. (Fig. 4.)

Body 1·1 mm. long in male. *Head* more or less rounded when examined dorsally; anterior margin of frons imarginated in the middle; each lateroverte with four setae, of which the innermost the strongest; sclerotized parts of occiput slightly convex, with two very strong and three moderately strong setae; dorsal margin of genae with one moderately long and a few very small setae. Each eye consists of a single prominent facet. Palpi more or less triangular, vertical, with three long and a few small setae. Inner margin and the lateral parts of the ventral surface of the head with a few very small setae. Theca of labium cordiform, labella about a half as long as the theca.

Thorax.—Median suture extending to the scutellum; mesonotal suture indistinct; prescutum with broadly incurved anterior margin and with a few moderately strong setae; the part formed by scutum with two transverse, curved rows of slightly smaller setae; scutellum broad, with incurved posterior margin and with two very strong setae in each lateral part near the margin; mesopleura broad, with a few small and three moderately strong setae; pteropleura with three very strong setae directed postero-laterally. Prothoracic spiracles small, rounded. Ventral surface of thorax flat, with very small setae, its lateral and posterior margin with strong setae; the middle part of the anterior margin of sternopleura transverse. Legs strong; dorso-posterior parts of the femora of the fore and the middle legs and the dorsal surface of the femora of the hind legs with strong setae; dorsal surface of tibiae with three longitudinal rows of very small setae.

Wings 0·2 mm. long, extending posteriorly as far as the middle of the tergite one + two, with one long seta in the middle and a few much smaller ones on the lightly pigmented patches which represent the traces of the longitudinal veins.

Abdomen more or less sacciform; lateral parts of tergite one + two extending as far as the middle of the abdomen; second sternite large, with uniform setae; membranous part of abdomen bears small setae arising from prominent thecae. Hypopygium very broadly conical, with a few long lateral setae.

The species has been recorded from *Tonatia amblyotis* Wagner, in Brazil; from *Phyllostomus hastatus panamensis* Allen, in Panama; from *Phyllostomus hastatus hastatus* Pallas, in Venezuela; and from a bat, at Soure, Marajo Id., East Para, Brazil.

New Synonym of *Speiseria ambigua* Kessel.

Owing to the kindness of Professor R. Matheson, I have been able to examine the holotype and the two paratypes of *Paratrichobius anduzei* Matheson (1945). I have found that this new species is identical with *Speiseria ambigua* Kessel (1925), and must be now regarded as a synonym.

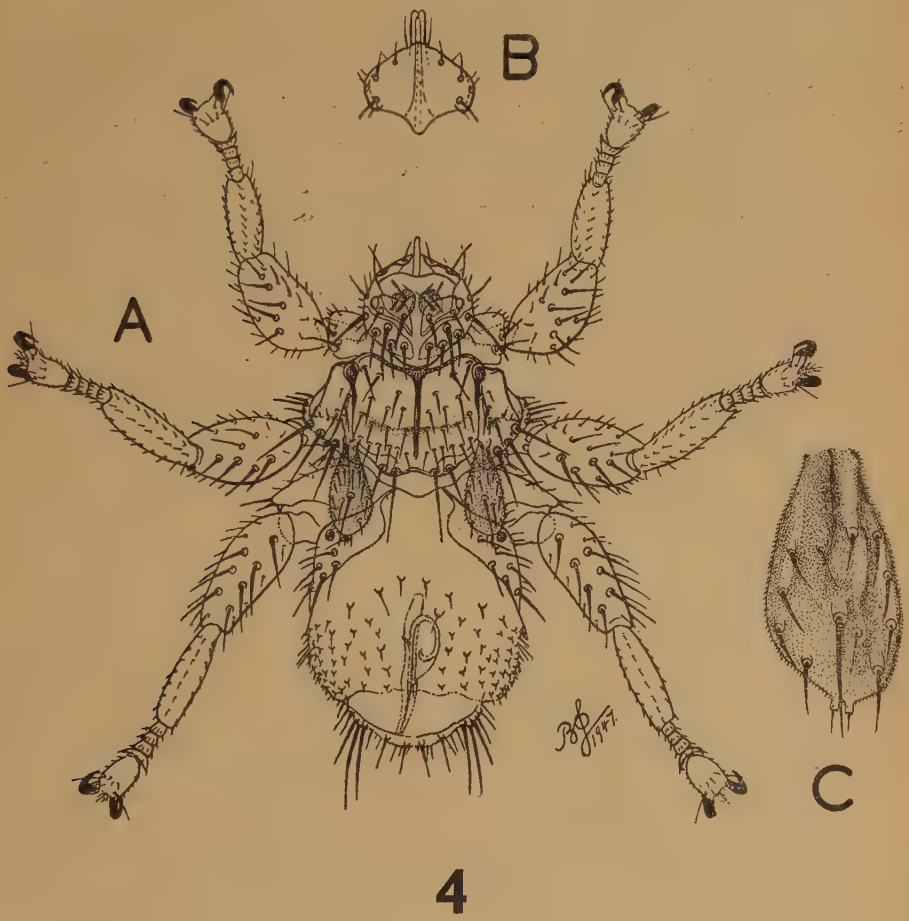

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FIG. 4.—*Aspidoptera minuta* Costa Lima. A, Dorsal view of male ; B, labium ; C, wing.

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THE SYSTEMATIC POSITION OF THE GENUS *MARRES* WALKER, WITH A REDESCRIPTION OF THE GENOTYPE (HYM.: CHALCIDOIDEA).

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The genus *Marres* was erected by Walker (1841) for the reception of a unique specimen from Gambia, West Africa. Walker named this insect *Marres dicomas*. In his description he wrote: "*pedum structura et alis nervorum dispositione Leucospidem simulans.*" Based on these words all subsequent chalcid taxonomists have placed *Marres* along with *Leucospis* and others in the family Leucospidae (or the Leucospinae, when they considered it to hold the rank of a subfamily).

Walker's type, the only specimen so far recorded of the genus as well as the species, is available in the British Museum. An examination of this specimen shows that it agrees well with Walker's description except in his remark "*frons antice bicornuta.*" I fail to notice any distinct frontal processes in Walker's type. It may be mentioned here that all those who dealt with the systematics of Leucospids subsequently have considered this as a very important character, evidently without examining the type. Schletterer (1890), Ashmead (1904), Schmiedeknecht (1909) and Weld (1922) gave so much importance to the words of Walker, quoted above, that they went to the extent of drawing up keys for the identification of leucospid genera accordingly. Excepting Ashmead, all others even supposed that in *Marres* two horn-like processes were borne on the vertex of the head. It is worthy of note that although such processes are present in another African genus, *Cerachalcis* Masi, and even more prominent ones are borne by the various members of the tribe Dirhinini, in Walker's type of *Marres* there is no indication of them. The front of the head, however, is deeply foveate for the reception of the antennal scapes and it seems probable that Walker meant only the bulge on either side of this fovea.

A careful, comparative study of Walker's specimen with all other named species of Leucospids in the collection of the British Museum, which comprises fifty species of *Leucospis*, three species of *Epexoclenoides* and four species of *Polistomorpha*, reveals that there is very little in common between *Marres* and the others to justify the inclusion of all of them together in one and the same subfamily. Schletterer (1890) made the following remarks on the genus in his monographic work on Leucospids:

"Die von Walker aufgestellte Gattung *Marres* stimmt im Flügelgeäder und in der Gestalt der Beine vollkommen mit *Leucospis* überein, was auch bezüglich der Hinterleibens der Fall zu sein scheint. Eine Mittelrücken, welcher breiter als lang und zugleich kürzer als der Vorderrücken ist, findet man auch an einigen wenigen malaischen *Leucospis*-arten. Der Vorderrücken und das Schildchen

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sind insoferne anders geformt wie bei *Leucospis* und *Polistomorpha*, als der erstere nach vorne verschmälert, das letztere herzförmig erscheint. Wenn ich Walker's Bemerkung "caput postice incurvum" richtig auffasse, so ist der Kopf hinten ausgerandet, was bei den vorhergehenden Gattungen nicht der Fall ist. Bei *Marres* ist ferner das dritte Fühlerglied das kleinste von allen, während dies bei den zwei gennanten Gattungen bezüglich des zweiten Fühlergliedes der Fall ist. Den meist auffallenden und besonders bezeichnenden Unterschied von *Leucospis* und *Polistomorpha* enthält Walker's Angabe, das die Stirne vorne zwei hornartige Fortsätze trägt—"frons antice bicornuta"—Auffallend ist es selbst für eine der übelbeleumundeten Walker'schen Beschreibungen, das weder in der Gattungsbeschreibung noch in der nachfolgenden Arts—beschreibung des Geschlechts, ob Männchen oder Weibchen, Erwähnung gethan."

From the foregoing it is evident that Schletterer based his remarks entirely on Walker's description. The observation that in the wing venation and structure of the legs *Marres* agrees well with *Leucospis*, is not quite correct. In the fore wings the stigmal vein is short, blunt and quite unbranched, whereas in *Leucospis* it is distinctly branched at the free end. Further, the characteristic section of *m* + *cu*, present in *Leucospis* and its allies, is wanting in *Marres*. In the general structure of the hind leg, particularly in the swollen and compressed femora with an armature of marginal teeth and the arcuate tibiae, *Marres* as well as many other non-Leucospids agree with *Leucospis*; however, they are characteristically different in their detailed structure. In *Marres* the bases of the hind femora are somewhat hollowed out or grooved, terminating in a distinct additional inner tooth besides the marginal row of teeth; on the other hand, in *Leucospis*, *Epexoclenoides* and *Polistomorpha*, the inner sides of the femoral bases are smoothly curved. The hind tibiae of *Marres* are more arcuate, do not bear any conspicuous spur, and on the outer extremity bear a distinct tarsal groove quite unlike those of *Leucospis* and others. Besides, the hind coxae in Leucospids are much broader at base than at apex, more compressed, with the dorsal side somewhat ridged and often bearing a tooth. Over and above these characters and the others cited by Schletterer, *Marres* also differs in the following points: the face is distinctly broader than long, the genae are outwardly arched, the eyes are not at all pubescent, the clypeus is narrow, somewhat semi-lunar and depressed, the labrum is short and transverse, and the mandibles short, broad and incurved. In all these characters as well as in the general formation of the thorax there is such a remarkable resemblance between *Marres* and the various genera of the Brachymerini of the family Chalcididae that I do not hesitate to regard the former as a member of this tribe.

A comparative study of *Marres* and *Larradomorpha* Stadelmann has further shown such a remarkable agreement between these two genera that I can hardly consider them distinct. Stadelmann (1892) erected the genus *Larradomorpha* to include another African species which he named *insignis*. Obviously, Stadelmann could not have suspected any close relationship between his species and *Marres*, particularly because Walker's observation "*frons antice bicornuta*" was not at all applicable to it. Dalla Torre (1898), however, seems to have considered the two somewhat related since he brought them nearer within the same group, the Leucospidae, in his catalogue of chalcids. But later

systematists have departed from this view and transferred *Larradomorpha* to the Brachymerini (= Chalcidini of earlier workers) on account of its straight, long ovipositor unlike that of *Leucospis*. The British Museum contains two specimens determined as *Larradomorpha insignis* Stadelmann by Ch. Ferrière. These not only agree well with Stadelmann's description, but have also been collected from Africa. An examination of these specimens has revealed that systematists since Dalla Torre have been perfectly justified in transferring this genus from the LEUCOSPIDAE to the tribe Brachymerini. The most remarkable fact, however, is the close morphological agreement between these and Walker's type of *Marres dicomas*. In both the head is shorter than broad, the antennal furrow is deep, the genae are outwardly arched, the clypeus is narrow, semi-lunar and depressed ; the antennae are relatively long and stout, the scape fairly long and somewhat shovel-shaped distally, the pedicel is short and bulbous, flagellum narrowed rather abruptly towards base and apex, bearing very short bristly pubescence, first flagellar segment very short and oblique ; eyes prominent and bare ; vertex smoothly rounded posteriorly ; the median carina between the antennae quite broad at the base and finely tapering towards the ocelli ; labrum short and transverse with the free margin rounded, mandibles short, broad, inwardly curved and without distinct teeth ; pronotum anteriorly narrowed, the mesoscutum somewhat trapezoid with the parapsidal furrows shallow and percurrent, axillae distinct and rounded posteriorly ; scutellum broadly rounded and gradually depressed medially towards the posterior so as to appear distinctly heart-shaped, the posterior margin forming a narrow ridge bearing about eleven longitudinal costae ; propodeum broad, but short and spinous posteriorly ; hind coxae long and not distinctly ridged : femora with an additional inner tooth at the base and a marginal armature of about 15 triangular teeth ; tibiae very arcuate, obliquely produced into a ventral spinous process at the apex and dorsally bearing a distinct tarsal groove which runs upwards to about a third of the tibial length, and head and thorax with coarse, large and rounded punctures and fine, long and shaggy pubescence. In coloration, however, the two disagree markedly. *M. dicomas* is a lighter-coloured insect with distinctly reddish brown head, whereas *L. insignis* is much darker with the head quite black. The single specimen of the former before me has its abdomen unfortunately broken off and hence its sex cannot be definitely ascertained. Since Walker in his description has made no mention of any ovipositor it is likely that it is a male. The two specimens of *L. insignis* available are both females and Stadelmann's description has also been based on this sex. Hence the elucidation of detailed specific differences between the two is possible only with further material.

Marres is also distinctly related to the Mexican *Acanthochalcis* Cameron. In the latter, however, the scutellum is not depressed along the middle posteriorly, the apical ridge of the scutellum is somewhat angulated and bears only two dorsal longitudinal costae ; the propodeum is not spinous posteriorly, the hind femora are distinctly and more deeply punctate on the outer side, the tarsal groove attains more than half the tibial length, the inner tooth of the hind femora is more towards the base, and the abdomen of the female is rather abruptly narrowed posteriorly with an ovipositor of its own length.

Since Walker's diagnosis is brief I take this opportunity to give below a more detailed description and figures of the type of *Marres dicomas*.

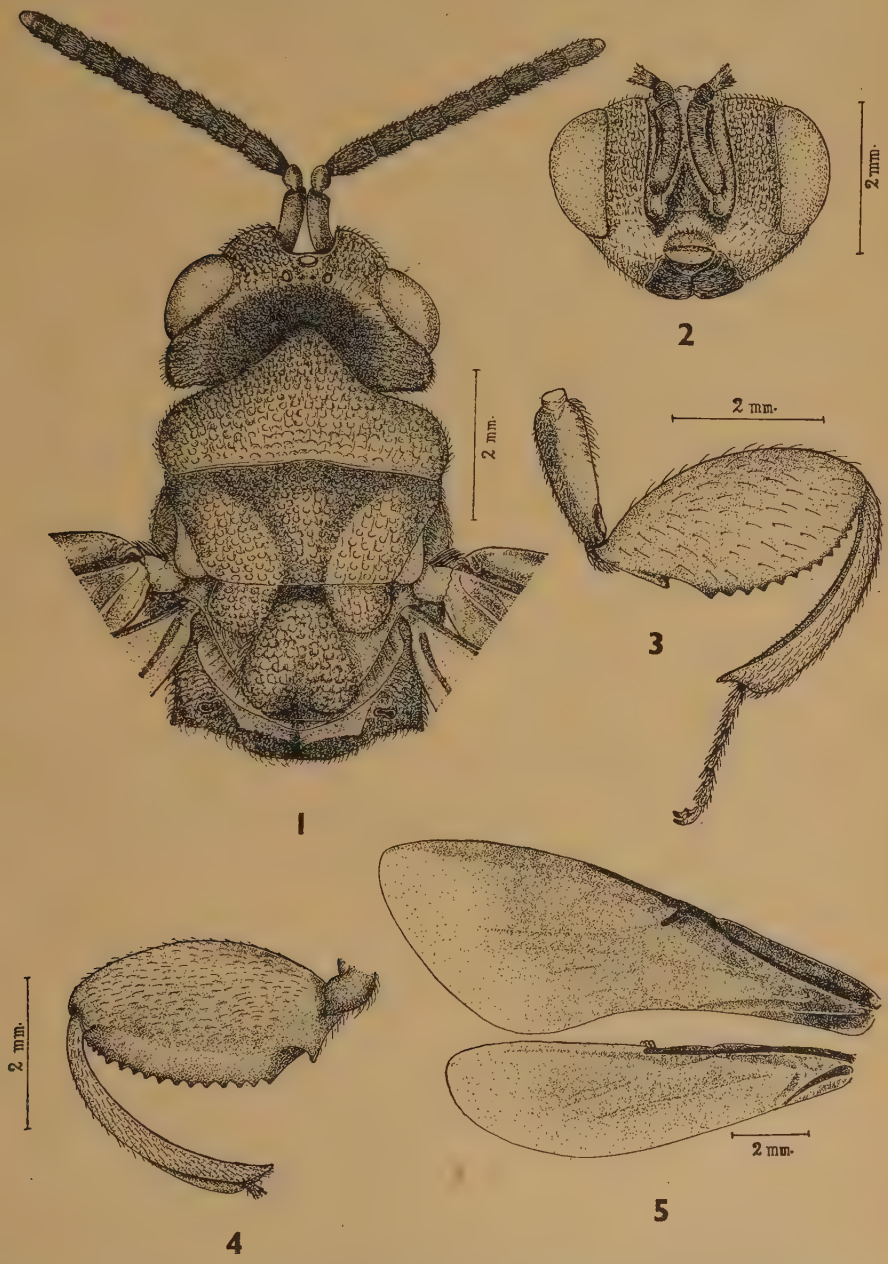
Marres dicomas Walker. (Figs. 1–5.)

General colour orange brown, somewhat shining. Antennae brownish black, scape and pedicel somewhat shining, flagellar segments dull, terminal segment lighter towards the tip. Eyes buff coloured. Ocelli almost colourless. Frons around antennal bases black. Pleura excepting the mesepisternum, the middle, sides and posterior margin of the mesosternum, the outer halves of the pro- and meso-coxae, the metanotum and the propodeum, fuscous. Tibiae and tarsi of fore and mid legs dark brown. Wings violescent. Fore wings fuscous, lighter towards the apex. Hind wings fuscous at the base, lighter towards the posterior margin and apex.

Head (figs. 1 and 2) transverse, not as broad as the thorax, in front view much broader than long; closely punctate, the punctures large and coarse but shallow; the antennal furrow and malar region smooth and somewhat polished, shaggily tomentose; the hairs white, sparse along the polished malar region. Clypeus narrow, somewhat semilunar, shining and depressed, sloping abruptly at an angle towards the labrum. Genae (fig. 2) in front view evenly convex. Antennal furrow more than a third as broad as the head-width excluding the eyes, deep, distinctly margined except just in front of the median ocellus. Median carina broad between antennal bases, tapering towards the vertex, strong to about half-way up the antennal furrow, with a straight, transverse ridge between the antennal bases. The head, in lateral view relatively broad, with an evenly curved bulge in front of eyes. Occiput not margined by a ridge as in *Leucospis*, but evenly curved towards the posterior on either side of the ocelli. Eyes prominent, elongate-oval, bulging and devoid of pubescence. Median ocellus the largest, lying relatively further in front of the lateral ocelli than in *Leucospis*. Antennae 12-segmented; scape long, almost cylindrical at the base, but ridged, and the two ridges slowly raised up towards the apex, with the intervening area pressed in on the outer side so as to appear semi-lunar in cross-section, the concavity facing the outer side, finely transversely wrinkled; pedicel shortly oval; flagellum obliquely articulated with the pedicel, narrowed uniformly towards the base and apex; first flagellar segment very short and oblique; the second longer, the remaining segments getting shorter in regular sequence; the last two rather indistinctly separable from one another; the terminal segment without any distinct annuli such as are found in *Leucospis*. Labrum narrow, transverse and smoothly curved at the apex, with fine pubescence. Mandibles relatively shorter and broader than in leucospids, somewhat turned inwards, the apices rounded, with a slight notch in the middle (*i.e.* without sharp teeth) and normally closing upon one another unlike those of *Leucospis*; coarsely striate and bearing a few fine hairs on the outer side.

Thorax (fig. 1) about one and a half times as long as broad, shaggily hairy, closely punctate dorsally and laterally; punctures coarse, large and rounded, merging into one another towards the posterior margin of the pronotum so as to form ragged transverse ridges. Pronotum much narrowed anteriorly, with rounded shoulders; hind border slightly curved forward, with sides almost vertical and more or less polished where the anterior femora at rest come in contact with them. Mesonotum trapezoid, shorter than broad; parapsidal furrows shallow, broad and percurrent. Axillae distinct, rounded posteriorly. Scutellum narrow at the base, broad posteriorly, with the outer angles well rounded and depressed along the middle towards the posterior, so as to appear obcordate; the posterior margin forming a narrow ridge with eleven short longitudinal costae. Metanotum slightly projecting beyond the scutellum towards which fine costae converge from its posterior margin. The spiracular area of the propodeum broad and angulate posterolaterally; the area of the propodeum between these also produced into a median and two lateral angulate processes, the median one bearing a short, dorsal, longitudinal carina; spiracles large, somewhat reniform and obliquely placed. Tegulae relatively broader anteriorly and not extending forwards so nearly towards the pronotum as in *Leucospis*. The anterior margin of mesepisternum distinctly impressed, smooth: in repose the fore femora are held apposed to this. Likewise the middle of the mesopleuron deeply impressed

to form a mesofemoral groove ; metepisternum produced into a pointed tooth in front of the metacoxae. The whole of the pleural region punctate with coarse, large and rounded punctures as on the dorsum.



FIGS. 1–5.—*Marres dicomas* Walker (holotype). (1) Head and thorax (dorsal view) ; (2) head (front view) ; (3) left hind leg (outer view) ; (4) left hind femur and tibia (inner view) ; (5) left pair of wings.

Legs, in general, more or less as in *Leucospis*, with the following differences : fore coxae broad at the base, subconical, with a lateral carina which is rounded at the coxal base, finely transversely striate ; femora slightly dilated, shorter than those of mid legs ; tibiae as long as femora, with a few short, spinous, apical processes besides the long, curved strigilis. Mid legs longer than fore legs : coxae broad and subconical, without any carina, finely punctate ; femora about 1½ times as long as fore femora, arcuate ; tibiae slightly longer than femora. Hind legs (figs. 3 and 4) : coxae long and sub-cylindrical ; femora compressed, about twice as long as broad, with scattered fine punctures and fine long hairs on the outer side, with the base on the inner side somewhat hollowed out or grooved, bearing a distinct inner tooth besides the marginal row of teeth (the tips of the tibiae lie in this groove in repose) ; the marginal armature composed of fifteen triangular dark teeth, the last three of which are much smaller than others, the whole forming a rather deeply serrate edge ; hind tibiae distinctly arcuate, apically drawn out into a ventral spinous process without any apical spur, flattened along the ventral and convex along the basal two-thirds of the dorsal side, the distal third of the dorsal side with a longitudinal tarsal groove ; the convex dorsal basal portion densely hairy with long bristly hairs ; ventral flattened side with a few scattered very short hairs. Tarsi of all legs densely pubescent, with stiff bristly hairs. Claws rather short and well curved.

Wings (fig. 5) with venation quite distinct from that of leucospids, but agreeing well with that of the Brachymerini. Submarginal vein long ; marginal vein very short ; postmarginal abruptly narrowed a little beyond its origin and extending up to a third of the length of the wing from apex ; stigmal vein short and of uniform thickness, not apically forked as in *Leucospis* ; the fragment of $m + cu$ characteristic in wings of leucospids entirely wanting. Hind wings with three hamuli.

Abdomen broken off except for the first gastral tergum, which is posteriorly a little broader than the thorax, about half as broad at base as at apex, almost as long as its basal width, with punctures finer than on thorax.

Type locality.—West Africa : Gambia.

Acknowledgments.

I am very much indebted to the Government of India for the award of a scholarship which has enabled me to study at the British Museum (Natural History). To the authorities of the Museum I am extremely grateful for allowing me all facilities to examine their valuable insect collections. Finally, I wish to record my sincere appreciation of the help rendered by Mr. G. J. Kerrich in discussing the subject matter of the present paper, examining the specimens and checking the conclusions.

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A REMARKABLE NEW SPECIES OF *PYCNODICTYA* SAUSSURE (ORTHOPTERA, ACRIDIDAE) FROM E. AFRICA.

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Pycnodictya zinae sp.n.

A relatively slender, but strongly rugose species, strikingly different from all known ones by the deeply incised pronotal crest and by the expanded lower carina of hind femur.

♂ (*type*).—Antennae fine, a little longer than head and pronotum together. Head rugulose and granose; frontal ridge somewhat expanded between antennae, constricted under the ocellum, its margins diverging strongly just before the labrum; surface of the ridge at the ocellum distinctly concave, elsewhere weakly concave, with small rugosities and granules; vertex strongly and roundly sloping; its margins raised, surface granose; lateral facial carina strongly curved, somewhat wavy.

Pronotum strongly laterally compressed, with high median carina, which is deeply dissected by the main sulcus; anterior section of the carina with practically straight upper edge and almost right posterior angle; its posterior section strongly convex in profile, but lowered before reaching the hind pronotal angle, which is parabolic. Anterior pronotal margin crenate, slightly projecting forward in the middle. Surface of pronotum and pleurae rugose and coarsely granose. Mesosternal lobe more than twice as broad as long, and equal in width to the interspace; inner angle of the lobe very broadly convex. Metasternal interspace twice as broad as long.

Hind femur granose and rugulose, relatively broad; upper carina crenulate and denticulate; lower carina strongly expanded, but suddenly lowered before the knee.

Elytron not reaching the apex of hind tibia; reticulation very dense and fine in the whole basal half; in the apical half, beyond the discoidal area, similarly dense reticulation extends obliquely to within one-fifth of the elytral length from the apex, the rest of the elytron being loosely reticulated, hyaline. Wing nearly twice as long as broad.

General coloration dark brick-red, with irregular black dots and small spots. Elytron with broken-up darker fasciae and spots. Wing bright cinnabar-red in the basal part, with a narrow blackish fascia, which is bent almost under a right angle and becomes wider posteriorly where it touches the hind margin; there is a suggestion of the radial ray, and the dark colour extends also along the front margin into the apical part, which is hyaline, but with the veins and veinlets brown and ochraceous. Hind femur with three indistinct dark spots above; outer side with shiny black granules along the carinae of the pinnate area; the expanded lower carina with a series of regularly spaced transverse blackish spots; inner side of the femur purplish-black, with an incomplete pale fascia beyond the middle and a complete one just before the knee, which is black, edged with pale colour. Femur is fringed with soft white hairs. Hind tibia on the inner and upper side a beautiful purple, with a broad pale postbasal fascia; spine purple, with black tips. Tarsus wax-yellow.

♀ (*paratype*).—Apart from the larger size and heavier build, differs from the male also in more broadly expanded lower carina of hind femur.

Length of body, ♂ 22·5, ♀ 29·5; pronotum, ♂ 6·5, ♀ 7·5; elytron ♂ 26, ♀ 32; hind femur ♂ 15, ♀ 17 mm.

Kenya: 7 miles east of Garissa, Northern Frontier District, 20.ix.1947, 1 ♂, 1 ♀ (*Z. Waloff*). The two specimens were taken on coarse red sand, the texture and colour of which is closely imitated by their integument.

The structure of pronotum in this species is so different from that in other

members of the genus that it might be justifiable to regard it as a generic character. However, the median pronotal carina, although very low in most members of the genus *Pycnodictya*, is as strongly raised, e.g., in *P. kelleri* Schulthess as it is in *P. zinae*, but remains undissected by the sulcus. On the other hand, the sulcus cuts the carina in such species as *P. dentata* Krauss and *galinieri* (Reiche and Fairmaire), but the carina itself is low and thick. The character is, therefore, not sufficiently definite to serve as a generic one.

Pycnodictya zinae sp. n. A, Hind femur, male; B, ditto, female; C, pronotum, male.

Another distinctive feature of the new species is the hind femur, with the lower carina strongly expanded and suddenly narrower before the knee, but a general tendency towards similar expansion is observed in other species of *Pycnodictya*, particularly in *P. dentata* Krauss.

The venation and reticulation of elytra being in agreement with the generic features of *Pycnodictya*, it appears best to leave the new species in that genus, although its position there is a somewhat isolated one.

EXPLANATION OF PLATE 1.

Pycnodictya zinae sp. n. (Male above, female below.)

B. P. Uvarov.

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NEW OR LITTLE-KNOWN SPECIES OF EXOTIC TIPULIDAE (DIPTERA): VI.

By Professor Charles P. Alexander, F.R.E.S.

(*Massachusetts State College, Amherst, Massachusetts.*)

The preceding part in this series was published in 1948, *Proc. R. ent. Soc. Lond.* (B) **17** : 18–27. In the present paper I am discussing various African species, chiefly from Rhodesia, Portuguese East Africa and Cape Province. Except where indicated to the contrary in the text, the types of the new species are preserved in my collection of these flies.

Limonia (Dicranomyia) mosselica sp. n.

Belongs to the *tristis* (*liberta*) group ; general coloration brownish grey, the praescutum with a broad, median, darker brown stripe ; legs brown ; wings greyish subhyaline, restrictedly patterned with brown ; Sc_1 ending just beyond origin of *Rs* ; cell 1*st* M_2 exceeding the distal section of vein M_{1+2} ; male hypopygium with the ninth tergite produced medially, the caudal border strongly convex, with three elongate setae on either side near base ; basistyle with the ventromesal lobe narrowed outwardly, with a concentration of long setae near apex ; on face of lobe with a pencil of long black setae ; dorsal dististyle unusually long and slender, the tip acute ; ventral dististyle fleshy, its rostral prolongation conspicuous, obtuse at tip ; rostral spines two, long and conspicuous, placed near base of prolongation.

Male.—Length about 6 mm. ; wing 7 mm.

Female.—Length about 6 mm. ; wing 6·5 mm.

Rostrum brownish black, relatively long, approximately one-third the remainder of head ; palpi black. Antennae with scape pruinose ; pedicel dark brown, flagellum black ; flagellar segments oval. Head grey ; anterior vertex (male) narrow, only about one-third the diameter of scape.

Pronotum dark brown. Mesonotum brown, grey pruinose ; praescutum with a broad darker brown median stripe, with indications of fainter lateral areas ; scutal lobes patterned with dark brown. Pleura dark brownish grey. Halteres with stem whitened, knob infuscated. Legs with the coxae dark brown, more or less pruinose ; trochanters brown ; remainder of legs brown, the terminal tarsal segments passing into black. Wings greyish subhyaline, the pre-arcular and costal fields more whitened ; a very restricted brown pattern, as follows : Arculus, origin of *Rs*, cord and outer end of cell 1*st* M_2 ; stigmal seam narrow and inconspicuous ; veins brown, whitened in the paler areas. Venation : Sc_1 ending just beyond origin of the angulated *Rs*, Sc_2 exactly opposite this origin ; cell 1*st* M_2 elongate, exceeding the distal section of vein M_{1+2} ; *m-cu* at fork of *M*.

Abdomen dark brown, more or less pruinose ; hypopygium somewhat more brightened. Male hypopygium with the ninth tergite produced medially, the caudal border strongly convex, the cephalic margin less strongly so ; two setae near apex of tergite and four others near each lateral border, the marginal three very long. Basistyle with ventromesal lobe small but complex, narrowed outwardly and more or less pointed ; outer end with conspicuous setae from strong tubercles, the outermost larger ; on outer face of lobe at near midlength with a close pencil of about 8 or 9 long black setae ; elsewhere on basistyle with an elongate cylindrical lobe on face, this with about four very long setae at and near tip, the longest pair only a little shorter than the lobe. Dorsal dististyle unusually slender for a member of this group, the tip acute. Ventral dististyle fleshy, its rostral prolongation

conspicuous, obtuse at apex; rostral spines two, placed close to base of style, slightly separated, the spines relatively strong. Gonapophysis with mesal-apical lobe dark-coloured, the apex curved laterad into a small hook.

Holotype, ♂, Cape Province: Mossel Bay, February, 1922 (*R. E. Turner*); British Museum (Natural History). *Allotopotype*, ♀; in Alexander Collection.

Limonia (*Dicranomyia*) *mosselica* is most similar to *L.* (*D.*) *gardineri* (Edwards) and a few allied regional forms, differing most conspicuously in the structure of the male hypopygium, particularly the vestiture of the tergite, unusually long and slender dorsal dististyle, and the armature of the basistyle and ventral dististyle.

Helius (Helius) paramorosus sp. n.

General coloration of body dark brown or brownish black; rostrum relatively long and slender, exceeding in length the remainder of head; legs brown, tarsi fading to yellowish white, involving the distal ends of basitarsi and outer tarsal segments; wings with a brownish tinge, cells *C* and *Sc*, with the stigma, darker brown; branches of *Rs* strongly divergent; cell 1*st* M_2 shorter than any of the veins beyond it, *m-cu* close to the fork of *M*; male hypopygium with the apical teeth of the outer dististyle very small, blackened.

Male.—Length, including rostrum, about 6·5–8 mm.; wing 6–8 mm.; rostrum alone about 0·8–1·0 mm.

Female.—Length, including rostrum, about 8 mm.; wing 7 mm.; rostrum about 0·8 mm.

Rostrum relatively long and slender, exceeding in length the remainder of head, black throughout; palpi black. Antennae with scape and pedicel brownish black, flagellum black; antennae relatively short, only from one-fourth to one-fifth longer than the rostrum; basal flagellar segments oval, the outer ones more elongate. Head dark brown to brownish black; anterior vertex narrow, less than the diameter of scape.

Pronotum and mesonotum chiefly dark brown to black, the very restricted pretergites and humeral region of praescutum obscure yellow. Pleura dark reddish brown to brownish black, darkest on dorsal portions. Halteres infuscated, base of stem restrictedly yellow. Legs with coxae and trochanters reddish brown; remainder of legs brown, the tarsi fading to pale yellowish white, this colour involving the distal third or less of the basitarsi; claws with slender basal spines. Wings with a brownish tinge, cells *C* and *Sc*, with the stigma, darker brown; veins brown. Venation: Sc_1 ending a short distance before fork of *Rs*, Sc_2 a little longer, placed near its tip; branches of *Rs* strongly divergent, cell R_3 at margin approximately three times as wide as cell R_2; cell 1*st* M_2 shorter than any of the veins beyond it; *m-cu* at or close to fork of *M*.

Abdominal tergites dark brown or brownish black, the sternites and hypopygium somewhat more brightened. Male hypopygium with the basistyle unarmed but provided with relatively abundant elongate setae. Outer dististyle relatively short and only gently curved, very indistinctly bidentate at tip, the teeth black. Inner dististyle about one-half longer than the outer style, the basal two-thirds more dilated and provided with abundant long setae, the narrowed outer portion paler and more blade-like, provided with shorter setae. Gonapophyses extending into slender pale blades, the outer portion at the bend with pale membrane that is provided with numerous pale setulae.

Holotype, ♂, Southern Rhodesia: Chirinda Forest, altitude 3600 ft., November, 1930 (*Cuthbertson*), No. 2807; "beside stream; curious bobbing motion while at rest." *Allotopotype*, ♀; Cuthbertson, No. 2800; "associated with *Dolichopeza cuthbertsoniana* in dark places along stream; clings to support, as a twig, with tarsus of left leg." *Paratopotypes*, 3 ♂; Cuthbertson, No. 2800. These bear various ecological notes: "Under leaves of overhanging vegetation

beside stream ; on mossy rocks in stream ; many under overhanging mossy rocks in dark places "—*Alexander Cuthbertson.*

The most similar described species are *Helius* (*Helius*) *morosus* (Alexander) and *H.* (*H.*) *submorosus* (Alexander), both from West Africa. These, while being generally similar, differ markedly in the venation, especially the branches of *Rs* and the shape of cell 1*st* M_2.

Pseudolimnophila chrysopoda sp. n.

Size large (wing, male, 9 mm.) ; mesonotum almost uniformly light brown, the praescutum with faint darker stripes ; flagellum brownish black, the base of the first segment restrictedly brightened ; legs clear light yellow ; wings with a strong brownish yellow suffusion, restrictedly patterned with brown, including the stigma and seams at origin of *Rs*, cord and outer end of cell 1*st* M_2 ; R_{2+3+4} relatively short and oblique, subequal to R_{1+2} ; *m-cu* about one-half its length beyond the fork of *M* or before the level of *r-m*.

Male.—Length about 10 mm. ; wing 9 mm.

Rostrum and palpi black. Antennae with scape and pedicel black, the latter somewhat more intense ; flagellum brownish black, the base of the first segment restrictedly brightened ; flagellar segments beyond the first one or two elongate-cylindrical, with long conspicuous verticils. Head dark grey, narrowed posteriorly.

Pronotum light brown. Mesonotum almost uniformly light brown, the praescutum with faint indications of darker stripes, the lateral portions more greyish ; pseudosutural foveae large, pale ; scutullum more yellowish on posterior portion ; postnotum grey pruinose, the mediotergite paler behind. Pleura chiefly dark brown, more or less variegated by paler. Halteres pale with darkened knobs. Legs clear light yellow, the outer tarsal segments infuscated. Wings with a strong brownish yellow suffusion, restrictedly patterned with brown, including the stigma and seams over origin of *Rs*, cord and outer end of cell 1*st* M_2 ; proximal portion of wing in the region of arculus and bases of the anal cells less evidently clouded with brown ; veins yellow, darker in the patterned portions. Venation : Sc_1 ending approximately opposite the fork of *Rs*, Sc_2 near its tip ; *Rs* elongate ; R_{2+3+4} relatively short and oblique, about one-fifth longer than R_{2+3} or subequal to R_{1+2} ; veins R_3 and R_4 long and sinuous ; cell M_1 about twice its petiole ; cell 1*st* M_2 rectangular ; *m-cu* about one-half its length beyond fork of *M* ; anterior arculus strongly preserved.

Abdominal tergites yellowish brown ; sternites and hypopygium clear light yellow.

Holotype, ♂, Southern Rhodesia : Umtali, Vumba Mountains, altitude 4500 ft., April, 1929 (*Cuthbertson*) ; No. 2386.

The nearest ally of the present fly is *Pseudolimnophila frugi* (Bergroth), of southern and eastern Africa. By my key to the African species of the genus (1924, *Ark. Zool.* **16** (18) : 4–7), this fly runs directly to *frugi*, from which it is readily told by the colour of the body, legs and wings and by the venation.

Pseudolimnophila (**Calolimnophila**) **imperita** sp. n.

Size small (wing under 9 mm.) ; general coloration cinnamon brown, conspicuously patterned with dark brown, especially the praescutum ; pleura chiefly black ; halteres brownish black ; fore coxa blackened, with a transverse obscure yellow ring, middle and hind coxae light yellow, remainder of legs yellow ; wings with a brownish tinge, patterned with darker brown and light yellow, chiefly marginal ; *Rs* long, angulated and spurred at origin ; supernumerary crossvein in cell R_3 at near three-fifths the length of the cell.

Sex ? Wing 8·3 mm.

Rostrum, mouthparts, palpi and antennae destroyed by Corrodentia. Head above light brown or greyish brown.

Pronotum yellowish brown, with a conspicuously dark brown median spot on scutum. Mesonotal praescutum light cinnamon brown, patterned with dark brown, including a capillary median vitta ; a broad dark humeral area, with a further broad lateral darkening ; more or less broken further darkenings occupying the region of the usual interspaces ; pseudosutural foveae large and conspicuous, dark and shiny, occupying the humeral darkened area ; posterior sclerites of notum chiefly light brown or yellowish brown, more or less patterned with darker, the surface pruinose or pollinose ; mediotergite somewhat protuberant on posterior half ; dorsal portions of both the mediotergite and pleurotergite yellowish brown, the ventral half and remainder of pleura brownish black to black. Halteres brownish black. Legs with the fore coxae black, narrowly ringed with an obscure yellow line, middle and posterior coxae clear light yellow, their bases narrowly blackened ; all trochanters yellow ; femora obscure brownish yellow, unmarked ; tibiae and tarsi clear light yellow. Wings with a strong brownish tinge, variegated with somewhat darker brown and more yellow areas, the latter as a series of marginal spots between the veins, especially distinct in the costal, radial and medial fields ; the darker areas are likewise marginal, alternating with the yellow spots ; disk of wing almost unpatterned, a series of small spots along vein *Cu* ; veins yellowish brown or light brown, darker in the patterned areas. Venation : Sc_1 ending just before level of fork of *Rs*, the latter elongate, angulated and spurred at origin ; R_{2+3+4} long, only slightly arcuated ; supernumerary crossvein in cell R_3 at near three-fifths the length of cell ; cell M_1 from two to three times its petiole ; *m-cu* about one-half its length beyond the fork of *M*, the inner end of cell *1st* M_2 slightly arcuated ; vein *2nd A* sinuous on outer half, strongly curved to the border.

Abdomen dark brown or brownish black ; basal sternites light brown medially, darker on sides ; outer segments more uniformly darkened ; abdomen broken beyond the fifth segment.

Holotype, Sex ?, CAMEROUN : Ngobilo, 5th September, 1931 (*J. A. Reis*).

This interesting fly was one of very many species of TIPULIDAE from the Cameroun sent to me since 1920 by my friend, Dr. Jacob A. Reis, who died in the Cameroun on 29th December, 1945. Although Reis is known primarily as a collector of birds, chiefly for the Carnegie Museum, Pittsburg, Pa., U.S.A., he collected many thousands of specimens of insects, including TIPULIDAE.

The only other described small member of the subgenus is *Pseudolimnophila* (*Calolimnophila*) *comes* Alexander, which is readily distinguished by all features of coloration of the body, legs and wings, and by the venation, including the small cell M_1, which is shorter than its petiole.

Austrolimnophila luteipleura sp. n.

Head light grey, the anterior vertex unusually narrow, less than the diameter of scape ; mesonotum chiefly dark brown, contrasting with the clear light yellow pleura and pleurotergite ; scutellum and mediotergite light grey pruinose ; halteres brown, base of stem restrictedly yellow ; legs brownish yellow or light brown ; wings with a very weak brownish tinge, unpatterned except for the pale brown oval stigma ; *Rs* more than one-half longer than the slightly arcuated R_{2+3+4} ; petiole of cell M_1 short, only from one-fourth to one-fifth the cell ; position of *m-cu* varying from one-half to four-fifths the length of cell *1st* M_2 ; abdominal tergites dark brown, basal sternites clear light yellow.

Female.—Length about 10 mm. ; wing 9–10 mm.

Rostrum brownish yellow, sparsely pruincse ; palpi brown. Antennae with the scape and pedicel dark brown ; flagellum broken. Head dark in colour, heavily light grey pruinose ; anterior vertex unusually narrow, slightly less than the diameter of scape ; head only moderately narrowed behind.

Pronotum obscure yellow, clearer in front. Mesonotum chiefly dark brown, the prae-

scutal stripes confluent or virtually so ; humeral region of praescutum more or less grey pruinose, scutellum and mediotergite more heavily light grey pruinose, the latter brownish yellow on sides. Pleura and pleurotergite, including the dorsopleural membrane, clear light yellow, unpatterned. Halteres brown, the base of stem restrictedly yellow. Legs with the coxae yellow or brownish yellow, more or less pruinose ; trochanters yellow ; remainder of legs brownish yellow or light brown, the terminal segments darker. Wings with a very weak brownish tinge, unpatterned except for the pale brown oval stigma ; veins light brown. Venation : *Sc* relatively long, Sc_1 ending opposite two-thirds to three-fourths R_{2+3+4}, Sc_2 near its tip ; *Rs* moderately long, more than one-half longer than R_{2+3+4}, the latter only slightly arcuated ; cell 1*st* M_2 rectangular, a little widened outwardly, with *m-cu* at near one-half to nearly four-fifths its length ; petiole of cell M_1 short, only one-fourth to one-fifth the cell ; anterior arculus lacking.

Abdominal tergites dark brown ; basal sternites clear light yellow, the outer ones more obscured.

Holotype, ♀, Southern Rhodesia : Chirinda Forest, altitude 3600 ft., November, 1930 (*Cuthbertson*) ; No. 2803. *Paratopotype*, ♀ ; in British Museum (Natural History).

The present fly is most similar and more nearly related to *Austrolimnophila griseiceps* (Alexander), of the Cape of Good Hope (Caledon Division), from which it differs especially in the coloration of the body and wings and in the venation.

Austrolimnophila plumbeipleura sp. n.

Size medium (wing, female, 8·5 mm.) ; head and thorax chiefly grey pruinose ; wings with a faint greyish yellow ground ; stigma oval, medium brown, relatively conspicuous ; Sc_1 ending about opposite two-fifths the length of *Rs*, Sc_2 close to its tip ; R_{2+3+4} only moderately arcuated ; *m-cu* at near two-thirds the length of cell 1*st* M_2 ; abdomen dark brown, the posterior borders of the segments restrictedly testaceous yellow ; sternites more uniformly pale yellow.

Female.—Length about 9·5 mm. ; wing 8·5 mm.

Rostrum light brown ; palpi darker brown. Antennae with the scape and pedicel obscure yellow ; flagellum broken. Head grey ; anterior vertex moderately wide, about equal in width to the diameter of scape.

Pronotum clear yellow above, more infuscated and pruinose on sides. [Mesonotum chiefly destroyed by insect pests]. Postnotum clear light grey pruinose. Pleura and pleurotergite infuscated, sparsely pruinose, to produce a more or less leaden appearance. Halteres obscure yellow, the knobs weakly infuscated. Legs with the coxae pale yellow, sparsely pruinose ; trochanters brownish yellow ; remainder of legs broken. Wings with a faint greyish-yellow ground, the prearcular and costal fields somewhat clearer yellow ; stigma oval, medium brown, relatively conspicuous ; exceedingly vague and restricted darkenings along cord and outer end of cell 1*st* M_2 ; veins brownish yellow, somewhat clearer yellow in the brightened fields. Venation : Sc_1 ending about opposite two-fifths the length of *Rs*, Sc_2 longer, close to its tip ; *Rs* long, about one-half to three-fifths longer than R_{2+3+4}, very slightly arcuated ; veins R_3 and R_4 subparallel to one another for their entire length ; cell M_1 about four times its petiole ; cell 1*st* M_2 rectangular, slightly widened outwardly, *m-cu* at near two-thirds the length ; anterior arculus lacking, its position indicated by a dusky cloud.

Abdomen chiefly dark brown, the posterior borders of the segments restrictedly testaceous yellow ; sternites more uniformly pale yellow.

Holotype, ♀, Portuguese East Africa : Border Farm, Rio Jardin, April, 1929 (*Cuthbertson*) ; No. 2386.

By means of keys to the regional species of the genus, the present fly runs to *Austrolimnophila griseiceps* (Alexander), of the Caledon Division, Cape of Good Hope. It differs in the details of coloration of the body and wings and in the venation, as the much smaller cell 1*st* M_2, which is only about one-half as long as the distal section of vein M_3. It is readily distinguished from *A. luteipleura* sp. n. by the coloration of the thoracic pleura and by the wing venation.

Erioptera (Meterioptera) quadrispicata sp. n.

General coloration of mesonotal praescutum and scutal lobes reddish brown, the posterior sclerites of notum and the pleura extensively yellow; halteres yellow; wings greyish yellow, the anal cells somewhat darker, the prearcular and costal fields light yellow; vein 2*nd A* with its distal third sinuous; male hypopygium with the apex of the outer dististyle obtuse, with abundant setae and appressed small spines; inner dististyle a sinuous pale blade, the elongate apex fringed with short setae; phallosome terminating in four short blackened points.

Male.—Length about 3·5 mm.; wing 4 mm.

Rostrum and palpi dark brown. Antennae broken. Head greyish brown, clearer grey in front and on the orbits.

Pronotum light brown; pretergites yellow. Mesonotal praescutum and scutal lobes chiefly rich reddish brown, the former darker medially, but not forming a distinct stripe; pseudosutural foveae pale, inconspicuous against the ground; tuberculate pits black; median region of scutum posteriorly and the scutellum yellow; postnotum chiefly yellow. Pleura yellow, the ventral sternopleurite and meron more reddened. Halteres yellow. Legs with coxae and trochanters yellow; femora brown, restrictedly yellow basally; remainder of legs broken. Wings with a greyish yellow ground, the anal cells somewhat darker; prearcular and costal fields light yellow; veins very pale brown or brownish yellow, the prearcular and costal veins yellow. Venation: *m-cu* just before the fork of *M*; vein 2*nd A* with the distal third unusually sinuous for a member of this subgenus.

Abdomen, including hypoypgium, yellow. Male hypopygium with the outer dististyle a straight stout rod, the apex obtuse, provided with abundant setae or small spines, some of the outer ones stouter and more curved. Inner dististyle a sinuous and twisted pale blade, the outer portion produced into a long slender point or rod, provided with numerous short setae (apex of rod broken and its length cannot be stated, but the whole style considerably exceeds the total length of the outer dististyle.) Phallosome terminating in four short blackened points, of which the lateral pair are longer than the inner ones.

Holotype, ♂, Southern Rhodesia: Salisbury, January, 1930 (*Cuthbertson*).

The most similar described regional species is *Erioptera* (*Meterioptera*) *subaurea* Bergroth, 1888, which differs especially in the structure of the male hypopygium, particularly the entirely different gonapophyses.

Cryptolabis (Baeoura) unistylata sp. n.

Size small (wing, male, less than 4·5 mm.); general coloration of thorax light greyish brown, pruinose; halteres yellow, the knobs very weakly darkened; legs light brown, the vestiture short and inconspicuous; wings with a uniform grey tinge; *Sc* short, Sc_1 ending before level of fork of *Rs*; male hypopygium with the dististyle a long narrow blade, approximately five times as long as wide; gonapophysis appearing as a pale blade, the outer apical angle produced laterad into a long spinous point.

Male.—Length about 3·8–4 mm.; wing 4–4·4 mm.

Rostrum and palpi brown. Antennae light to medium brown; flagellar segments oval, with coarse scattered setae and still longer verticils. Head grey.

Thorax light greyish brown, without pattern; pretergites obscure yellow; pleurotergite more yellowish. Pleura reddish, heavily grey pruinose. Halteres yellow, the knobs very weakly darkened. Legs with the coxae pale brown, sparsely pruinose; trochanters obscure yellow; remainder of legs light brown, the terminal tarsal segment darker; vestiture of legs short and inconspicuous. Wings with a uniform greyish suffusion, the prearcular field somewhat more yellowed; stigmal region barely differentiated; veins pale brown. Venation: Sc_1 ending some distance before the level of the fork of *Rs*, Sc_2 a short distance from its tip, placed about opposite two-thirds the unusually long straight *Rs*; R_2 about two-thirds R_{2+3+4}; R_3 nearly straight, not deflected cephalad at outer end, as in *claripennis*, R_4 bent more strongly caudad; vein *2nd A* very gently sinuous at near midlength.

Abdomen dark brown, the hypopygium a little more brightened. Male hypopygium with the apex of the basistyle narrowed. Dististyle subapical in position, appearing as a long relatively narrow blade, the outer fourth narrowed; style about five times its greatest width. Gonapophyses appearing as flattened pale blades, the inner apical angle obtusely rounded, the outer apical angle produced laterad into a long spinous point or arm, the tip acute.

Holotype, ♂, CAPE PROVINCE: Gr. Winterhoek, Tulbagh, altitude 4000 ft., November, 1916 (*K. H. Barnard*); received in exchange with Edwards. *Paratopotype*, ♂.

Cryptolabis (*Baeoura*) *unistylata* is similar and related to the larger *C.* (*B.*) *claripennis* (Alexander), which differs in the coloration of the body, legs and wings. In this latter fly the wings are more whitish subhyaline, with the veins more clearly defined against the ground and with differences in venation, as the much longer *Sc* with Sc_1 ending opposite or beyond the fork of R_{2+3+4}. The male hypopygium of the present fly is entirely different from that of *C.* (*B.*) *nigrolatera* (Alexander) and allies.

UN *NIPHECYRA* NOUVEAU NUISIBLE AU PAPYRUS (COL., CERAMBYCIDAE).

Par P. Lepesme
(*Paris*).

Niphecyra papyri sp. n.

Long. : 16–17 mm. Allongé, les élytres un peu élargis en leur milieu. Brun clair, les côtes élytrales roses, le pronotum au contraire garni de pubescence rosée entre les bosses et les tubercules. Les hanches, la région apicale du métasternum, la marge apicale des sternites abdominaux et partiellement le dessous des fémurs également roses.

Front finement ponctué, pourvu d'un sillon longitudinal médian accusé. Lobes inférieurs des yeux à peine plus longs que larges, distinctement plus longs que les joues. Scape antennaire assez long, médiocrement fort. Pronotum transverse, pourvu latéralement d'une courte épine obtuse au niveau du tiers basal et d'un tubercule peu élevé situé un peu au dessus au niveau du tiers apical ; disque à relief très faible, la bosse médiane même tres peu élevée, à ponctuation plutôt fine et très éparse. Écusson transverse, subtrapézoidal. Élytres allongés, progressivement et faiblement élargis de la base au milieu, se rétrécissant ensuite en courbe régulière jusqu'à l'apex ; calus huméral saillant, les tubercules basilaires d'où partent les deux principales côtes discales en revanche faibles, peu élevés ; ponctuation moyenne, peu dense, assez régulière, s'affaiblissant dans la moitié apicale, les points à contour très net. Saillie mésosternale inclinée en avant.

Type au British Museum : Uganda : Kawanda (*H. Hopkins*, 17.xi.39), Commonwealth Institute of Entomology ; un cotype de même provenance dans ma collection. Les larves taraudent les tiges de papyrus.

Niphecyra papyri se séparera aisément des trois autres espèces décrites à ce jour de la façon suivante :

1. Le disque du pronotum sans fortes bosses et visiblement et plutôt fortement ponctué . . . . . 2.
   Le disque du pronotum avec de fortes bosses et sans ponctuation nette 3.
2. Le calus huméral fortement saillant ; le milieu du disque du pronotum finement ponctué en avant . . . . . **papyri** sp. n.
   Le calus huméral effacé ; le milieu du disque du pronotum grossièrement ponctué en avant . . . . . *rufolineata* Qued.
3. Les lobes inférieurs des yeux distinctement plus longs que les joues *interpres* Kolbe.
   Les lobes inférieurs des yeux à peine plus longs que les joues *uniformis* Br.

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TO BE HELD IN THE SOCIETY'S ROOMS

41, Queen's Gate, S.W. 7

1949

Wednesday, September 7
" October 5
" November 2

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